The Builder.

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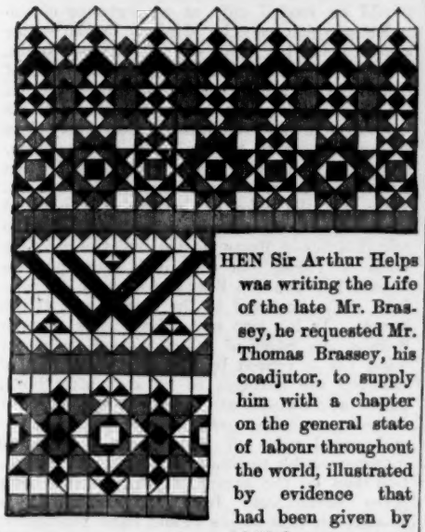
"Work and Wages."



WHEN Sir Arthur Helps was writing the Life of the late Mr. Brassey, he requested Mr. Thomas Brassey, his coadjutor, to supply him with a chapter on the general state of labour throughout the world, illustrated by evidence that had been given by skilled persons, in reference to his father's career. The subject, however, was found to be so large, and Mr. Thomas Brassey's industry had brought together such a mass of important facts bearing on the subject, that a separate volume was determined, and this is now before the public.* In it Mr. Brassey treats of strikes, trade unions, hours of labour, the commercial progress of other nations compared with that of our own, co-operation, piece work, and other "burning" questions in debate, with great impartiality and an evident desire to arrive at just conclusions. He urges rightly that clearer knowledge will bring charity and forbearance where jealousy and distrust now unhappily divide the master and the man. There is much truth in the observation of the recently-married Père Hyacinthe,—"*Toutes les fois que le voisin commet une faute, accusons-nous nous-mêmes, nous ne l'avons pas assez édifié.*" Mr. Brassey's book is calculated to *édifier* many, and we trust it will be so used. We will condense some of his observations with such comments as may seem necessary. We agree with him that English workmen but imperfectly realise the serious odds against which our industrial establishments have to contend, from the difference in the rate of wages here and on the Continent. It requires skill in the employer, and energy in the workmen, to compensate for the difference. Perhaps the most successful engineering establishment on the Continent is M. Krupp's, at Essen. Between 8,000 and 10,000 men are employed. Day workmen and helpers receive only 1s. 2½d. to 1s. 9½d. a day, while the wages of smiths, puddlers, carpenters, and masons, average 2*l.* 8s. to 6*l.* 15s. a month. These wages would not satisfy the English artizan; yet they are the highest which are paid in any part of Germany. This low rate of wages is to be explained partly by the cheapness of provisions; and it may here be remarked that the comparative cheapness of provisions in some districts of the Continent goes a long way to compensate our foreign competitors for the higher price which they have to pay for coal and iron. Moreover, the mode of living adopted by the artizans in Germany is more frugal than English habits will permit. The writer points out that the working-classes in the agricultural districts in France are, as a rule, more provident than the same class in England. When the works were first commenced on the Paris and Rouen Railway, the contractors endeavoured to introduce a system by which the workmen were to be paid once a fortnight instead of once a week, as had been the custom in England. But very soon after operations had been begun, the Frenchmen requested that the pay might take place only once a month, whereas the English navvy generally desires to be paid on Saturday night—and, by the following Wednesday, often wants something on account of the week's work. It is the opinion of Mr. Lothian Bell, one of our highest authorities, that, after all the efforts of our iron-masters to contend with the difficulty of high-priced labour by the improvement of machinery, labour costs 15 per cent. more in England than on the Continent, and this disadvantage in his opinion entirely neutralises the advantages we derive from our great facilities in the proximity of our iron-mines to our coal-beds. Our workmen are not sufficiently alive to the necessity for the exercise of the utmost efforts of ingenuity, in order to enable capital invested in England to hold its own in the industrial campaign.

Speaking of the effect of supply and demand, as opposed to the action of trade-unions, Mr. Brassey says our operatives have but a faint conception of the rise of wages which has taken place abroad in countries where trade-unions did not exist, and where the improvement in the workman's condition was attributable solely to the increased demand for labour. From the tables given in the report prepared by Mr. Phipps, on the industrial classes in Wurtemburg, it appears that the average increase in the rate of wages, in eight branches of manufactures and industry, during the last thirty years, amounted to between sixty and seventy per cent. In the building trades the rise of eighty to ninety per cent. is to be explained solely by the unusual activity in the trades. As a general average, sixty-nine per cent. may be taken as the increase in the daily wages for the out-door labourers. In their class the increased demand for labour is peculiarly noticeable.

The advance in wages in the building trades in London has been considerable; but the writer maintains that it has been the necessary result of the altered relation between the supply of workmen and the demand for labour. Abundant evidence in support of this explanation of the cause of the rise of wages in all branches of trade is supplied by employers by no means friendly to the trade-unions. Mr. Trollope, for example, in his evidence before the Commissioners, says:—"Hitherto there has been such an enormous pressure for work, that almost every man who can handle a tool has been taken on at an unreasonable rate." Again, speaking of the advance in wages in the building trades in the provinces, Mr. Mackay, a member of Mr. Brassey's staff, observes:—"Wages have risen, during the last twenty years, from twenty to twenty-five per cent.; but by the force of circumstances they would have risen as much or more if trade-unions had never existed." We fully believe that the rate of wages cannot long continue so high as to deprive capital of its fair return; for if it did, capital would seek some other investment of a more satisfactory nature. Neither can the rate of wages long continue below the amount necessary to maintain the labourer and his family. The fluctuations in the rate of wages between the two limits depend entirely upon the varying demand for labour.

In the United States the wages of skilled workmen average from 9s. to 15s. a day, and those of unskilled workmen from 2s. 6d. to 7s. 6d. It cannot be supposed, says Mr. Brassey, that so great a difference between the reward of labour on the opposite shores of the Atlantic is due to the superior organisation of trade-unions in the United States. In New England there are powerful combinations among the artizans, but none among the agricultural labourers; yet, as compared with the same class in England, the condition of the common labourer is, of all others, the most improved by emigration to America. And let it be observed that, as agriculture is the most flourishing, so it is the most important of all the industries of the United States. The value of the total annual production of the leading industries has been estimated by Mr. Wells at 1,365,000,000*l.* To this total agriculture contributes 685,590,000*l.* The demand for labour to bring under cultivation the vast tracts of land still unoccupied is such that it has never yet been satisfied. Hence a rise of wages in strict conformity with an economical law.

In one of his chapters, the author maintains what some would deem a paradox; namely, that daily wages are no criterion of the actual cost of executing works, or of carrying out manufacturing operations; and he does this to reassure those who fear that we may no longer be able to compete with foreigners. It is quite possible, of course, that work may be more cheaply executed by English workmen, notwithstanding that their wages have largely increased; but there must be no artificial restraints by trade-union by-laws if that is to be hoped for.

At the commencement of the construction of the North Devon Railway, the wages of the labourers were 2s. a day. During the progress of the work their wages were raised to 2s. 6d. and 3s. a day. Nevertheless, it was found that the work was executed more cheaply when the men were earning the higher rate of wage than when they were paid at the lower rate. Again, in London, in carrying out a part of the Metropolitan Drainage Works in Oxford-street, the wages of the bricklayers were gradually raised from 6s. to 10s. a day; yet it was found that the brickwork was constructed at a cheaper rate per cubic yard, after the wages of the workmen had been raised to 10s. than when they were paid at the rate of 6s. a day. Again, in Russia the nominal price of labour is lower than in any other country in Europe; yet the manufacture of iron is at least as costly in Russia as in England; and it is considered politic by the State to give an artificial encouragement to the iron manufacturers by paying a bounty of 4*l.* per ton on all rails made in the country.

The contract for the Paris and Rouen line included some difficult work. There were four bridges across the Seine, and four tunnels, one of them one mile and five-eighths in length, passing through hard limestone. The English were chiefly employed on the difficult work. The French labourers drew away the stuff, or wound it up the shafts; but the mining was done by Englishmen. In the tunnels the skilled work was all done by them. At one time there were five hundred Englishmen living in the village of Rollebois, most of whom were employed in the adjacent tunnel. Although these English navvies earned 5s. a day while the Frenchmen employed received only 2s. 6d. a day yet it was found, on comparing the cost of two adjacent cuttings in precisely similar circumstances, that the excavation was made at a lower cost per cubic yard by the English navvies than by the French labourers. In the same quarry at Bonnières, in which Frenchmen, Irishmen, and Englishmen were employed side by side, the Frenchmen received three francs, the Irishmen four, and the Englishmen six francs a day. At those different rates, the Englishman was found to be the most advantageous workman of the three.

If our agricultural labourers were better paid and bred, we have very little doubt that they would do more work, and do it better too.

Mr. Brassey believes that it is equally true that the hours of labour (of course he means

* Work and Wages practically Illustrated. By Thomas Brassey, M.P. London: Bell & Daldy. 1872.

within certain limits) are no criterion of the quantity of work done. Using greater diligence an energetic man may do as much in nine hours as he formerly did in ten. When hours are shortened with the expressed intention of doing correspondingly less work in that time, it is necessary to remember that trades, which can only flourish by successful competition with the foreigner, must, to a certain extent, be regulated with reference to rules established abroad. The British workman must take care that he does not, by working shorter hours, so increase the cost of production, that competition with foreign industry becomes impossible.

Mr. Brassey is quite satisfied with the success that has attended British enterprise in competition with foreign industry, and has no gloomy forebodings. Summarising some statements by Professor Leone Levi, he says,—

"In 1763 the population probably was 10,000,000. In 1870 it was 31,000,000, showing an increase of 326 per cent. But if the population has increased three times, the imports have increased thirty times, namely, from 10,000,000*l.* to 303,000,000*l.*; the exports nearly twenty times, namely, from 13,000,000*l.* to 244,000,000*l.*; the navigation of ports from 1,500,000 tons, to 38,000,000 tons; and the shipping belonging to the kingdom fourteen times, namely, from 550,000 tons to 7,100,000 tons. The whole trade of the kingdom actually doubled itself during the last fifteen years, having grown from 268,000,000*l.* in 1855, to 547,000,000*l.* in 1870. The sum invested in railways in 1845 was 88,000,000*l.* In 1870 the capital embarked amounted to 530,000,000*l.* The increase most fully demonstrates the growth of capital, the vastness of our accumulations, and the extent of our industrial resources."

With a few words to note that Mr. Brassey, while he sees the difficulty of introducing the co-operative principle into the arrangements between masters and men, hopes yet to see it more largely introduced into British industry, we must end our notice. The introduction of this principle would teach workmen to appreciate the difficulties and hazards attending the investment of capital in business. We shall be glad to see a cheap edition of this volume extensively circulated.

STONEHENGE: THE AUTUMN CAMPAIGN.

THE ring of arms and the roar of cannon, happily unshotted, that have attracted so many eager spectators to the Wiltshire downs, cannot be expected to find a very distinct echo in our pages; and yet, while the attention of the country is riveted on that which is at once a test and a lesson of military skill, we may be pardoned for recalling, with no little pleasure, our own long advocacy of the importance of the engineering education of our troops. From the Italian war we drew the inference that a great change was setting in in the relative power of attack and defence,—a change that would tend greatly to modify the principles of military architecture, and thus, in the sequel, to alter many of the main features of our cities and towns. The lesson given as to land-fortifications by the siege of Gaeta was repeated, with reference to floating batteries, by after events and the various calamities that beset those gigantic iron-clad structures, in some of which the primary principles of naval architecture were altogether set at defiance. This series of costly lessons, — costly in far more than money,—in needlessly sacrificed life,—seemed to culminate in the loss of the *Captain*. With the short, sharp campaign that terminated in the decisive battle of Sadowa, a fresh set of most instructive facts claimed our attention. The influence of arms of precision and of repetition in the decision of a critical battle was there proved to be of the utmost importance. In fact, it might almost have been said that a new arm was given to the soldier. At all events, infantry tactics had to be wrought out under new conditions. The shield to be opposed to the terrible efficacy of the rifle, we showed, was to be forged by the agency of the pick and the shovel; and we watched, with no small anxiety, the slow development of the new relations between the parade-ground and the spade.

With the slow deliberation with which one of our old sailing three-deckers might have got under weigh, the armed force of England has spread out its canvas to the breeze. A great change, from which we would gladly expect the results promised by its proposers, has been introduced into the entire system of our land forces. Purchase is no more; and the scientific corps have received a wise and liberal measure of justice, which it was deplorable to see any one who bore Her Majesty's commission attempt to prevent or to postpone.

To all this, on a scale increasing year after year, has been added an annual repetition of that practical education of the soldier which, under the old system, was deferred till he was in the presence of the enemy. Of the details of our home campaign it is not our purpose to speak. Their value is recognised by all competent judges. And the opinions which we have so frequently advanced, as to the increasing importance of the labouring and enduring, as compared with the merely fighting, qualities of the soldiers, are now receiving, each year, fresh illustration.

It adds extraordinarily to the interest of the campaign of the present autumn that it has taken place on those wide and unbroken downs that preserve, in the midst of the busy civilisation of the nineteenth century, an aspect not very different from that which they may have borne in the time of Alfred, of Offa, or of Cæsar. Nay, in the time of Cæsar himself, so far as any evidence of change or of decay can be obtained from the memory of man, or the references of the earliest chronicles, they may have been dominated, as they are to-day, by the same solemn, mysterious watch-towers,—the abandoned home of a race whose very name has been obliterated. It cannot but strike the philosophical student of history with admiration that the latest outcome of a science which has been actively prosecuted since the time of Galileo,—we may say, since the time of Alexander,—appears to be a return to that circular plan which was common among that stone-building people who have raised so many monuments in our own and in other countries, that yet remain the very *crux* of the archæologist.

We are not about to enter into any argument as to the date, origin, or archæology proper of Stonehenge. The subject has been not unfrequently raised in our columns. And yet, having witnessed the dotting of the Wiltshire downs with the trim tents of our troops, having seen the roads filled by regiment after regiment of a splendid cavalry, and choked by the long trains of the improvised means of transport; above all, having seen the grey trilithons of Stonehenge lighted up by the scarlet, and gold, and green of the uniforms of the foreign officers of distinction who have assisted at our manœuvres, and contrasted the intelligent respect shown by the owners of names famous in European history with the vandalism and neglect which are now attacking these irreplaceable monuments with the chisel of the gravestone cutter,—we are anxious to offer our readers a few considerations that are, as we think, novel. We wish, for a moment, to regard Stonehenge, not so much from the archæological point of view as from that which is offered by the higher motives of the architect. The evidence afforded by such features as choice of site, orientation, indication of religious rite or faith, and resemblance, or the reverse, to any known religious or civil structures, has never, we believe, been discussed or even fairly stated. We wish to avoid what is disputed, but to bring out more clearly than has yet been done what is certain, but what has been remarkably overlooked.

Few ruins in the world,—not one in England,—can so powerfully affect the imagination as Stonehenge. Its first view is never to be forgotten. No picture, no description exists, that in any way does justice to the grandeur of the scene. Leaving the picturesque street of Amesbury, the distance of which town from the nearest railway station has preserved to it much of the character of the England of five-and-twenty years ago; passing the fine old church, in which three of the seven lancets of the choir have been replaced by a fine Early Decorated window some 500 years since, the road crosses the Avon by a stone bridge, just below a broad weir and tumbling waterfall. The noble timber and stately grounds of Amesbury Park shadow the links of the river. Turning to the west, on leaving the town, the road diverges on passing one of those fast-vanishing features of pre-railway England, a turnpike; and runs over broadly-swelling undulations towards the open country. Clumps of well-grown timber, and the scarped chalk that bounds the park, crested with a dense zone of trees, are left to the right hand. To the left opens a wide range of down towards Salisbury Plain, on which groups of wizened and elfin-looking trees mock the expectation bent on the giant stones. At about a mile and a half from Amesbury the brow of a hill is surmounted by the road. The last dense clump of timber is passed. Before the view stretches a wide expanse of heathy down, on a gently-rising plateau, in the middle of which, in solitary grandeur, is Stonehenge.

Very much has been written as to this unexplained relic of a hoary antiquity; very much, too, that the visitor will do well to leave unread, or to banish from his head, if he unfortunately have prepared himself for a visit by the unprofitable study. The word Druid must be unpronounced. The ingenious, half-crazy theory of Stukely, which, for fault of a better, dominates most of the literature of the subject, should be named only as an instance of the audacity which may be attained by the writer who projects his facts out of his own brain. We must remember that almost all our ideas of Druidical rites are derived from Cæsar; and that the account given by that great general of his campaigns in Gaul and in Britain has a very close family likeness to the bulletins of Napoleon. Each was the account given by the general, when safe from fear of contradiction, of his own exploits, for the sake of producing a political effect. The Commentaries were framed for the *gobe-mouches* of Rome, as the bulletins were for those of Paris. In each it is often possible to read between the lines a story very different from that presented to the Forum and to the Bourse. In his two scrambling raids through Britain, the latter of which turned to actual flight (as is proved by the clumsy pretext of ordering the hostages to be sent after him), Cæsar never looked at the walls of the centre of British power, the great city of Verulam; the widespread ruins of which bear a far more incontrovertible testimony to an ancient civilisation than do the scraps of gossip which Cæsar gives second-hand from Divitiacus. It is remarkable that people should have received in simple good faith an account involving such ridiculous marvels as some details of the natural history of Gaul, according to Cæsar. Taking, then, what he says of the Druids for what it may be worth, there is not the slightest connexion to be traced between a priesthood whose rites were of a forestal character, and the mighty masons who wrought Stonehenge.

The first idea that impresses the intelligence (when fancy allows reason to commence his work), is that of the antiquity of this giant structure. Language fails to give us any such measure; human tradition, in its most shadowy, yet most ineffaceable form, that of the name, is utterly lost. The names of heroes are at times so embalmed in the language of a country that their memorial is all but eternal. Those of the two builders who may most closely vie with the founder of Stonehenge, Solomon and Souphis, are ineffaceably connected with the mighty wall that girds Mount Moriah, and with the vast bulk of the great Pyramid. In other cases, the name survives the meaning of its associations, as in Kit's Cotyhouse and, perhaps, Silbury Hill. But here the Saxon strangers gave only their own simple title of Hanging Stones to a monument as mysterious to them as it is to us. If their British predecessors had any more definite tradition, it has perished. In the associated instance of Avebury, a yet more ancient megalithic work has only a Saxon name. Hackpen, in the neighbourhood, has a British sound, but one that is mute as to its significance. No word lingers in human speech to tell of the origin of the mighty pile Stonehenge.

As regards the entire group of the megalithic remains of Wiltshire, Stonehenge is, there can be little doubt, the most modern. It shows undeniable traces of an elaborate masonwork which is far less visible at Avebury. The great stones of the impost preserve, in one or two cases, even a distinct arris. The mortises and trusses are apparent. The circle of stones immediately within the great line of the trilithons present indications leading to the conclusion that they were not only wrought, but polished. Their geological character shows that they came from quarries different from those (alike unknown) that furnished the larger blocks. None came from any part of Wiltshire, or of the entire range of the chalk districts. Icebergs have been pressed into the service, as the carriers of the larger blocks from—no one has yet suggested what mountain. But icebergs would not have selected and brought from some other localities, the smaller stones, of a character adapted to bear a good polish. In one on the left hand of the principal part of the building, is yet evident a long vertical groove, as if made for the turning of a door. The very high state of art which the masons of Stonehenge had attained, as well as the yet remaining sharpness of some of the work (while less carefully selected stones have become

shapeless from the influence of weather), are reasons for concluding this Wiltshire marvel to have been one of the latest efforts of the megalithic art of England.

Tradition, then, is utterly silent as to Stonehenge. In the earliest notes we have of its existence, it appears vast, dim, and unknown, even as it is to-day. Language has failed to embalm any reference to its origin. Geology has refused as yet to tell where its builders sought their well-selected and carefully-squared blocks. What can we know about it?

In the first place, we must remark on the compact and castellar form of the ruin. To this all the representations fail to do justice. As seen from the first point of view, on the Amesbury road, it might be thought to be yet habitable. That it was a complete and highly-finished building there can be no doubt. Whether the interstices of the gigantic coins and pillars were filled by wood or by smaller stonework, whether the roof was conical or of other form, we have little as yet to tell us. The nearest approach to the plan is found in the temples or churches of Abyssinia, which have one great conical roof covering their concentric rings and divisions.

The building was not an ordinary abode, such as the megalithic chambers of the Mediterranean islands well may have been, even if the abode of giants. It must have been devoted to some specially solemn purpose, whether of state, of religion, or of the two combined. Whatever were the details now lost, a great central hall, with fine graduated thrones or altars, is surrounded by an ambulatory, and dominates a sort of small interior theatre or place of audience.

It must be remembered that the relation between the vallum, or remains of a bank and ditch, that surrounds the outer wall of Stonehenge at a distance approximately equal to the diameter of the building, is obscure. There is nothing to make it an integral part of the monument. Stones lie in one or two places near its periphery, and it may, of course, denote the existence of a certain external fence, or hedge and ditch; but even this is uncertain. There is an essential and primary difference between the earth-building and the megalithic inhabitants of these regions, to which we shall presently refer, which is enough to warn us never to assume an identity of structure between a mound and a building which it may surround. The circular plan of structure, which possesses extreme advantage as a defensive characteristic, is common to most of the megalithic remains. In Stonehenge, while the external wall is circular, the plan of the central hall approaches the horse-shoe form. No small amount of practical science is involved in the harmonious adaptation of these distinct elements of structural arrangement.

The central hall itself was not calculated to contain a large number of persons. If their stature had been that of our own times, the building would have been inconveniently crowded by more than 600 persons. It would not seat the House of Commons. About 200 might find room in the inner hall, the same number in the outer, and again the same number in the inner, ambulatory. If the stature of the inhabitants were larger than our own, these numbers must be diminished. This, considering the costly nature of the building, points rather to the seat of the throne than to that of the altar. The worship of the spot must have been restricted to a sanhedrim of giants.

The site of the building has been determined by what we may call truly architectural considerations. It is not placed in astronomical azimuth, as was the great Pyramid, and as were most of the Oriental temples. It occupies a commanding position, although it is in its turn commanded by a swelling eminence of the hill on which it stands, much as the site of the temple of Solomon was by that of the fortress which, under the third dynasty, was named Antonia. Its portal faces the site where the direction of some of the streets of the ancient city is yet indicated on the soil. At twice the distance of the diameter, the straight central avenue was guarded by a vast block of stone, probably bearing the insignia of the monarch, or some emblem of the venerable structure, and compelling those who entered to turn to the right or to the left, as a mark of respect on setting foot within a palace. The grave and stately habit of the people is indicated by the magnificence of the avenues, of which we have relics at Avebury and elsewhere, and by the great regularity often to be observed in the lines indicating the plan of their streets and cities.

Although not astrolatric in its position, or visibly connected with the observation or the veneration of the planetary bodies, Stonehenge was built by masons who were not without some knowledge of astronomy, at all events as matter of observation. A giant stone lies, 100 ft. from the circle, in a position over which an observer, on the summer solstices, may now (and many annually do) see the sun rise from the stone known as the altar. Thus, whether palace or temple, Stonehenge is a monumental calendar.

The worship, if such it were, of the builders of Stonehenge, appears to have been unlike that of any faith now existing on earth. In all Egyptian temples, and in those Syrian, Grecian, Roman, and Western sanctuaries which show marks of relationship to Egyptian knowledge and tradition, the *cella*, or holiest place, forms an essential part of the sacred building. We find this at Thebes, at Jerusalem, at Athens, at Pæstum, at Baalbec; we find it in Rome, at Canterbury, at St. Alban's, at Westminster, and at York. We find it in every church of Latin or Anglican rite. It is replaced by the kebleh in the mosque. The form of the central hall is more approaching that of the basilica, or Roman tribunal, than any other which we know. But it differs from the basilica in possessing five principal thrones or canopies instead of one.

The numeric arrangement of the building is not one that is familiar to us. Five, three, and two are the normal numbers, used by the builders. The great trilithons are five. The council-table, or altar, is alone. The piers of the outer wall were thirty in number. The internal divisions of the plan, as far as discernible, were five, viz.,—the outer and inner ambulatories, the space between the trilithons and the inner circle, the main hall and the apse behind the altar stone. If we attempt to associate the number with that of the minor planets, the sun being indicated by the pointer, we still fail to note anything that can be associated with the moon. From the irregularity of the path of that planet, no architectural feature can be determined by astronomic reference to the moon. Sir Walter Scott, in his imaginative indication of the tomb of the Wizard by the cross of red thrown on it by the moon beam, has taken a poetic licence which no astronomer can condone. We rather find indications of a people who used a decimal notation, than any other inferences to be drawn from the numeric arrangement of Stonehenge, and of most cognate monuments.

To go further is only to guess. We stand, at Stonehenge, in the presence of a monument of great antiquity and of lost tradition. It was reared by a race that had attained extreme mechanical skill, producing masons of ability. Its materials were brought from sources as yet undiscovered; but stone from different geological formations was selected for different objects. The building was not astronomic or astrolatric in its purpose; although its builders have left proof of astronomical observation. It was disposed with a picturesque skill in choice of position and of orientation of which any architect might be proud.

It appears, from its dimensions, to be rather palatial than templar in its design. It evinces no relation to any existing form of worship, although it contains something that recalls the idea of an altar, or perhaps still more faithfully of a council-table. Everything about it is dignified, enduring, colossal,—approaching the superhuman. That the faith and worship of its founders were associated with the hope of immortality is a natural deduction from the fact that the megalithic builders had the habit of burying their dead, a custom by which they are ethnographically distinguished from the conterminous tribes (whether contemporary or otherwise) of earth-building, barrow-rearing people, who burned their dead. Nay, the megalithic cromlech builders buried their chieftains not only in costly sepulchres, but in the very attitude of prayer. Further, as yet, we cannot go. We have called Stonehenge an unpenetrated mystery. In the age which has witnessed the invention and the application of the spectroscope we decline to use the word impenetrable.

Canterbury Cathedral.—It is estimated locally that to repair the damage an outlay of between 3,000*l.* and 4,000*l.* will be required. The work of clearing away the ruins has already begun, and the restoration will, it is understood, be carried out by Messrs. Gaskin & Godden, of Canterbury, builders, under the direction of Mr. H. Austen, the cathedral surveyor.

COLOURED GEMS, AND A FEW THOUGHTS ABOUT THEM.

IN these days of rapid change and never-ceasing progress and unquiet, it is interesting, and may be salutary, to some of us, to go back in time and see what our forefathers did. They were quieter than we are, and went about in slower coaches, and took more time over things, and certainly, as a rule, thought over matters before coming to conclusions for a much longer time than we of this present day are able to do or do do. There may be some disadvantages in this slow method of work, but it has its advantages; for to give timely thought to a thing is almost always to do it better, and to save time in the end. We are going on at a most rapid pace, always by rail, and so no one can possibly say that we are standing still, and not moving on; but the real and vital question is, where are we going, and is the movement made really "progress" in the sense of everything being upon the whole better than it was? Say that railways are better than the old coaches and the pack-horses of past days; but who shall say that the *mental* or even *bodily* good to be got out of the travelling is an "improvement?" Musical instruments, again, are all improving, we are told on all hands; but are they indeed so? Old Straduarius contrived to make violins which no one in these mechanical days pretends to be able to rival. We say nothing of sculpture and painting; but there is one subject, just now, of some interest which illustrates these remarks. What is to be the *future* of gems,—of diamonds and pearls,—as objects of beauty, and as human adornments? In old days no difficulty seems to have been felt. People knew well what use to put jewels to, and how and when to wear them. To have a gem was to utilise and to display it, without affectation and without ostentatious display. Large gems, as well as small ones, were equally well worn, and added not a little to the beauty of the dress which they were bought to adorn.

We have before spoken of the cutting of diamonds and of their singular value, and of the place they hold in Nature's great storehouse of the Beautiful. But there are other gems besides diamonds, and hardly less beautiful,—coloured stones of wonderful richness and power of touching the sense of the beautiful in man, as the ruby and emerald, and others, and it is to them that we would now call a moment's attention: to the cutting of them, and to the difference between them and the diamond itself, and a word also on the "poetic beauty" that some more imaginate peoples seem to have found in precious stones. It is in an artistic sense, and as how to best show forth the beauty of a gem, and as to the cutting and polishing of it, that we are mainly concerned; for it is a melancholy fact that, for the most part, and with but few exceptions, the modern and mechanical gem-cutter makes a mistake, and cuts away just where he ought not to cut at all, and where he should cut, he goes wrong or does not cut enough.

Let us, by way of example, take the ruby, the next gem after the diamond itself on and in which Nature seems to have impressed the idea of beauty. It is not a little remarkable, and we might philosophise for some time about it, that while the diamond is made up of pure carbon, or simple black and opaque charcoal, the ruby, the next in order in value and beauty, is nearly made up of pure alumina, or common clay,—98·5 per cent.,—the colouring matter, iron, making up the rest of it; the mere trace of lime found in it being unappreciable.

Nothing, we may venture to say, in Nature's chemistry is more wonderful than this fact of the dull, colourless, and lifeless clay, becoming *metamorphosed*, by some hidden and almost miraculous way, into the transparently clear, red-coloured, and almost living gem! Imagination itself fails to find a theory to account for all this, and no progress in chemistry can invent a theory to fit it. It is a somewhat curious coincidence that the ruby, as well as the diamond, and other precious stones, are so often found associated with gold: where they are there gold is almost sure to be present. Nature produces these her riches together, and it afterwards is the province of *art* to keep them together, and to exhibit them as one object. How much remains to be done before this artistic feat is well performed; for, as things are, the beauty of the stone is as often as not spoiled in the cutting and filing. We are inclined to think that no *coloured* stone should be *cut* at all. Rubies, for instance, always look richer by the

being simply polished or cut *en cabachon*, or tallow-topped, as it is termed. It is the marvellous depth, and purity, and intensity, of colour, as seen in the ruby, the sapphire, the emerald, and such-like coloured stones that make up the beauty and value of them, and not, as in the colourless diamond, in the coloured sparks of light which are seen in it. The blue sapphire, it may be noticed, is simply a variety of ruby or corundum.

We live in practical and mechanical days, and in times of universal enlightenment, and general knowledge, and in a state of positive suspicion of things we cannot quite see into; so that all that is "dreamy" and mystical in the "stones of fire" has well nigh disappeared. But the time was when, in the possession of a precious stone of price, a man held in his hand, and carried about with him, a real poetic charm, almost a *material poem*. Is the world really improving? is a question that we cannot help repeating. In these days a gem is simply a pretty thing to be worn by the rich and fair, because it is pretty, and costs a good deal, and evidences at once the wealth and taste of the wearer; but the time was, as in the days of Jerome, when the sapphire and the ruby were a good deal, nay, infinitely, more than this. That great doctor himself thoroughly believed that the sapphire could procure not only the favour of princes, and could pacify enemies, but could also free from *enchantment*, and obtain a man freedom from captivity. It also prevented evil and impure thoughts, and was such an enemy to poison, that if put into a glass bottle with a venomous insect it would kill it. Strange fancies these, and how different the feelings of those who held them, and believed in them, to those of us whose only mystery concerning them is the present and future ruling of the diamond market! It must surely be a very ingenious man who could fairly argue the world into the belief that the getting above and superior to these harmless fancies added to the value and interest of these wonderful beauties of nature. Not, be it observed, that all the mystery of them is done away with, for no science, however advanced, has as yet been potent enough to divine a cause for them, or why they came into existence at all. Their origin truly is as mysterious as is that of the beginning of life itself. Nothing, indeed, can be fuller of artistic thought than is this curious subject of precious stones, and we could say much on it in many ways, and at some length, but it is impossible to cease wondering at the marvellous colour found in them in such small quantities, yet so vivid and full of intense beauty. In the emerald, for instance, is to be found the most intense green colour, surpassing any green herb or plant in colour; indeed, so vivid is the colour given forth from this splendid gem that it was anciently thought to give a green colour to the surrounding air, and to be capable of colouring the water it was dipped into. But if the intensity of the green colour to be found in the emerald is a wonder, no less a wonder is it,—beyond all chemistry it would seem,—as to what it is that causes it. Formerly it was thought that chrome in a most minute quantity coloured the emerald, but lately it has been found that the colouring matter is organic in its origin; indeed, that the green colour in the gem is of the same kind as that which colours the leaves of trees and the blades of grass. Where then does it come from, and what was that organic something which could exist when the dull inorganic clay passed into the clear emerald? The most subtle chemistry can tell us but little or nothing about such marvels. Hard words in plenty, but little else.

There is one other curious fact, or rather one among many others, connected with the colouring of gems, worth notice, for the fair for whom jewels are made might be yet fairer were but a little more *thought* about it in the "market." Colour in most things, as we all know, is found to add to the value of them. A picture is more valuable than a line drawing. A coloured flower is more attractive than a colourless one, and things by daylight look the better as more full of colour than they do by candlelight. But the colourless diamond, perfectly pure, and without trace of colour, is in the "market" fully 50 per cent. above, or more valuable than the palely-coloured stone from the newly-discovered African diamond-producing district. In the lustre of a fine gem of either kind, there is little or no difference; but the difference lies in the fact of the African diamond being tinged with the faintest possible tint of *straw* or *pale yellow colour*. To many this might seem to add to the beauty of the stone, and to give it warmth, and to harmonise it with its gold setting; but fashion rules all things, even the hard and intractable diamond. If the colouring matter in the emerald is a mystery, so is it in that of the coloured diamond, for so faint is the trace of it, and so infinitesimally small is the quantity of colouring matter added to the pure carbon of which the gem is composed, that the profoundest chemical analysis has failed to detect what it is with any certainty. We can but theorise, and perhaps some of us call upon the "imaginative faculty" to help us to solve the mystery; but even here we soon come to an end, and not even a Swedenborg, who "saw nature at work in the deep recess of her vast laboratory," could do more than dream!

CONSTRUCTIVE CARPENTRY, JOINERY, AND STAIR BUILDING.

WE have before us a book that deserves the attention of architects, builders, and operatives and not alone of them, but of members of various other crafts, workers in metals as well as in wood and stone, to whom a practical knowledge of the rudiments, at least, of geometry is indispensable for an accurate designing or "setting out" of their workmanship.* To the carpenter, joiner, stonemason, and metal worker, this book will be specially valuable. In a word, the work contains the constructive science of carpentry and joinery simplified and epitomised, yet withal comprehensive and plain for building operatives of the most ordinary capacity. Mr. Riddell's former works evidenced his ability as a workman and an instructor; the book under notice proves him to be a thinker, a worker, and a thorough technical teacher of his art. He has struck out an almost new path for illustrating the most difficult forms of constructive carpentry and joinery in the present volume, and by the aid of cardboard models, which at the same time form the plan and the elevation (for the stretched-out elevation can be at once lifted over the plan), he proves to a palpable demonstration the accuracy of his lines for producing a perfect execution in detail of the work required.

We may premise here that this new volume and condensation of Mr. Riddell's previous works is divided into three sections: the first treating of "Practical Geometry" as applied to carpentry and joinery, and more particularly to the plans of construction laid down in the book. This section includes eight plates or cardboard models, some cut for illustrating the constructive development in elevation, others left uncut for the purpose of testing the learner's powers who may desire to copy them and construct cardboard models independently of those in the book. The second section of the work deals with the most important problems in carpentry and joinery, including the construction of difficult forms of framing, panel, or other work standing on a given slant, the way to obtain the cuts, bevels, and mitres. The "setting out" and construction of different forms of roofs on irregular plans and the methods of obtaining the bevels and cuts for the purlins, jack-rafters, and hip-rafters, &c. There are also methods and models given to find cuts and mitres of work standing on rake and level; the construction of niches whose ground-plan being a semi-ellipse and the elevation or front rib a semicircle; the construction of a niche standing in a circular wall; and the construction of niches on other plans. Similarly to these there are methods given to find a curve on louvre-boards for circular, turret, cupola (dome), or other work; the construction of ribs for lath-and-plaster groin or vault in masonry; the construction of door-frames with semicircular heads, standing in a circular wall, with jambs radiating to a centre, and for those which stand in a circular wall, the pulley-stiles being square with chord-line of plan, with the development of a veneer for bending round the same.

Plates 9 to 24 inclusive, embracing some cardboard models, belong to the second section of the work; the cardboard models, 9, 10, 11, and 15, are well-selected examples of illustrations for showing the construction of splayed framing and panel-work, as also of a perfect model of a roof either in the flat as a plan or elevated as a model. The ordinary plates are equally well chosen, and may be utilised by the workman with nearly equal advantage as the others. The lines and methods given are applicable to a variety of other work in carpentry and joinery for obtaining the bevels, lengths, and exact cuts which may be wanted in its construction.

The third and most important section, as also the most ambitious, in the book is that devoted to "Lessons on Handrail Construction." The plates and cardboard models, cut and uncut, in this section, are entitled to every commendation for their originality, clearness, accuracy, and the ingenuity displayed in their "setting out." Here is, indeed, handrail construction developed, simplified, and demonstrated. Here is every line almost, and every section, in the elevated work projected on the plate beyond the plan, yet still attached to it, and the section being cut through to half the thickness of the cardboard, the model of the handrail and wreath, when lifted, is made to stand perpendicularly over the plan, winding round its cylinder, and both shanks of the wreath, or straight portions of the handrail, standing on their proper pitches. Nothing could be more exact or beautiful than the several illustrations given in the plates and cardboard models on handrailing.*

In our notice of Mr. Riddell's former work, "New Elements of Handrailing" (vol. for 1870), we entered into detail on several matters connected with the use, progress, and practice of the art in the British islands, so it is unnecessary to go over the ground again on these matters. However, we desire specially to draw the attention of building workmen to the few short practical lessons given and illustrated so admirably by models in the present work. With a very little study the workman who still adheres to the antiquated methods of working handrails by the aid of drums, cylinders, boxes, cradles, and other expedients, can entirely dispense with their use. Even the aid of falling-moulds (though useful to know their methods of construction) may also be entirely dispensed with. The construction of the face-mould for the wreath of a handrail is a very simple operation indeed: the curves on the template or mould are simply portions of a semi-ellipse, or, in other words, the section of a cylinder cut obliquely; the circle, or its quarter, being the ground-plan, its elevation or pitch being the developed elliptic section, ranging or winding over that plan. It is immaterial whether the workman constructs the face-mould in its elliptic form by the aid of two pins or nails, with the aid of a string, or uses a trammel. The former is the go-ahead American fashion, and is an expeditious method. The trammel is, we think, the safest for the inexperienced. The prime essentials are the obtainment of the proper bevels and the application of the moulds obtained to the plank. On the correctness of the drawing or "setting out" depends the accuracy of the moulds and bevels belonging. Whether the stair be a platform one or one having winders, the ground-plan of each being semicircular, it is of the utmost importance to the learner in his first practical lesson to understand the part that tangents play in the formation of a handrail. Both the tangents and the bevels for the joints in the construction of the wreath are mutually dependent on each other, and may be said to be inseparable. A reference to the cardboard models in Mr. Riddell's work will prove this at a glance.

In plates 25 to 32 inclusive, there is comprised all that is practically needed by those who have already some knowledge of stair-building and hand-railing. Methods are given and illustrated for obtaining the moulds for wreaths where the planks have to be thrown of two unequal pitches. It may be said that these methods are applicable where the wreath has to wind over portions of two flights of unequal incline, owing either to a difference in the height of the risers, or in cases where it is necessary that the handrail should rise a certain height in a given number of feet, to suit exigencies not uncommon to stair-building.

Although the use of scrolls was discountenanced, and their methods of construction eliminated from Mr. Riddell's former work on

* The Practical Carpenter and Joiner; illustrated by Cardboard Models (new and original). By Robert Riddell, author of "Hand-Railing Simplified," "Practical Geometry," "The Carpenter," "New Elements of Hand-Railing," &c. London: printed by Virtue & Co., City-road.

* A word here may not be amiss to the workman or other student using Mr. Riddell's work. The plans should be carefully studied, and the cardboard models attached carefully handled. The models are not intended for rough and constant usage, but with a proper degree of care they will last for years. It would be far better, however, for the young workman to carefully copy the lines, and construct a series of similar models of cardboard, veneer, or the thicker seasoned material. The knowledge and the practice he will obtain by doing so will repay him well for the little trouble he may experience.

handrailing, he has considered it advisable, as we (and others) have differed with him, to include a plate treating on the construction of the scroll in the present book. Though American stair-builders have abandoned scrolls for the commencement of the hand-rail, and adopted panelled octagon and other forms of newels, scrolls are still extensively used throughout the three kingdoms. There is, indeed, some truth in the author's remark about the "very objectionable bundle of balusters standing on curtail step, forming a receptacle of dust, cobwebs, and other offensive matter." The dust and other offensive matter need not exist, nor is it necessary that the bundles of balusters should be retained, though the scroll may, and still receive a more ornamental support, from a line perpendicular to the joint on its shank to its eye or centre. The problem, plate 7, anent the construction of a pyramid, or a piece of framing or panelling of pyramidal shape, is worthy of extended notice. The cardboard model is simple and correct, but its construction, simple as it is, has puzzled thousands of carpenters and joiners in the obtainment of the different bevels necessary, and their proper application afterwards. Out of this problem may be said to spring a variety of others applicable to the construction of framing standing on the slant, the hips of roofs, the preparing of columns in joinery, elevated soffits, and domical, conical, and other complex forms of framings and coverings.

THE SOCIAL SCIENCE ASSOCIATION AT PLYMOUTH AND DEVONPORT.

THE inaugural address of Lord Napier and Ettrick on Wednesday was a very able one, but the work of the Congress might be said to have commenced on Thursday. An excellent address on Law Reform, by Sir John Coleridge, the Attorney-General, was admirably delivered, and the several sections met immediately afterwards. In the section of economy and trade, at the Royal Hotel, Mr. Thomas Beggs read a paper "On Arbitration in the Settlement of national Disputes," in course of which he said:—Were Berlin, or Vienna, or London in the extremity that Paris found herself in 1871, there are in each city crowds of men who would be ready to take advantage of that extremity, and try to desolate the homes, in the midst of which they had found a shelter. The ruffianism which has been generated by vice and neglect would be only too ready to commence the work of spoliation when the opportunity occurred, and the work of the incendiary baffles all military strategy. It is surely wise to rescue the industrial classes from such leadership as this. He then referred to the encouragements for hope that the time for international arbitration is at hand. These arise from the danger which had been pointed out, and from some hopeful indications that a nobler ambition will supervene in France, and stimulate higher aims. The best preparation for the great work that all good men desire to see—a friendship among nations, is to break down every barrier to free intercourse, close every custom-house, and abolish all duties upon exports and imports; in a word, establish perfect free trade. Science and commerce are the great civilisers. The greatest encouragement, however, is supplied to us by the result of the Congress at Geneva. All speculation as to its award is now at an end, and at length two powerful nations have submitted to arbitration a dispute that once assumed a threatening importance. A dispute which involved far greater considerations than any pecuniary compensation has been settled by peaceful means; the spirit of an aggrieved nation has been appeased, and without the aid of the sword. The result is valuable as a precedent, as showing what many people doubt, that arbitration is practicable; but it is scarcely less valuable in teaching us the importance of maturing a code of international law.

In the Health Section, Mr. H. W. Acland, M.D., F.R.S., presided. A paper by Mr. P. H. Holland was read by Mr. Michael, Q.C., on "What Steps should be taken to guard against Sewage Poisoning?" No collection of filth should, he said, be allowed anywhere under any circumstances. The only safe course would be the immediate removal of every disgusting subject, and to take care that none lodged by the way, as it was less from sewage than from its deposit from which danger and annoyance proceeded. As little foul air as possible should be allowed to form in the sewers, or, if it did, it should escape where it would do the least mischief. He advocated the free ventilation of sewers outside the dwellings, and the absolute non-connexion of the sewers with the internal parts of the house. Mr. J. N. Stevens, M.R.C.S., in another paper, advocated drains being made of Portland cement; they should be at such angle as would allow the rapid flow of sewage to outfalls. The interiors should be smooth. The sewers should be oval. He objected to the use of pipes for carrying off the gases, believing the foul air would be carried in at the windows if they were used. The sewers should be disinfected with charcoal or chloralum. In the discussion Dr. Hearder pointed out the difficulty of carrying out the chemical means proposed, and said the bringing up pipes from the ground to the tops of the houses would be impracticable. He did not see why, in some places, large shafts should not be used for carrying them up. Dr. Hardwicke, medical officer of health for Paddington and Bayswater, objected to the ventilation by pipes, and believed the practical remedy against gases was flushing with a proper water supply. Dr. Nankivell thought the best plan was to have short pipes placed into sewers at no great distance from each other, which might intercept the foul air in its passage. Mr. Bulteel, F.R.C.S., drew attention to the necessity of proper supervision in the laying of drains, pointing to cases where wells had been poisoned through carelessness in regard to this. Mr. E. Vivian was in favour of tall shafts, but would have them so constructed that the weather or lee scuppers should be opened according to certain winds. Mr. Michael pointed out that the great thing was to have no connexion between sewers and human habitations. Mr. T. Baker, barrister, read a paper on the prevention of disease. In the discussion that followed, Dr. Shrimpton said diseases were not contagious except under those conditions and in those places where they may be produced. Dr. Hardwicke expressed regret that under the late Government Bill no provision had been made for appointing properly-qualified veterinary surgeons, engineers, and it might be analytical chemists, to act in conjunction with the medical officer of health. Earl Fortescue entirely agreed that it would be most desirable that medical officers of health should have the assistance of veterinary and engineering skill at their disposal.

In other sections, namely, Licensing and Trade, Repression of Crime, Jurisprudence, and Education, a number of papers were read and discussed. One of the most important discussions took place in the thinly-attended section on the repression of crime. It was carried on between experts, and had the direct value which complete knowledge can give it. A paper was read by Mr. J. B. Baker strongly advocating the adoption of cumulative punishments for minor offences. The system is being adopted, and is said to work well. The difficulty is how to apply it. Miss Carpenter stated, as the result of her long experience, that the severity which was best for society was best for the criminal, and that the constant bringing up of incorrigible offenders, and the repetition of the same ineffectual sentence, inflicted great injury on society. Colonel Radcliffe, of Birmingham, testified to the immense diminution of drunkenness which had been caused by the enforcement of the new Licensing Act in that borough, the cumulative penalties of which he regarded as a most valuable step in legislation.

The mayor of Plymouth gave a grand reception at the Royal Hotel, which was very full. The Association had this time double municipal patronage, in the two corporations of Plymouth and Devonport, the first one of the oldest, and the latter one of the youngest, in England. The two towns shared the visit of the Association, and both did all they could to make their visitors feel that the long journey to this far western seaport, with all its natural beauty, its historic interest, and its present importance, was well worth the trouble and the cost.

On Friday the Health Section was but thinly attended, but the gentlemen present were nearly all practical men. Mr. W. H. Michael read a paper on the principles which should characterise a new Sanitary Bill. There seemed to be a feeling that Mr. Stansfeld's Bill of this year was unsatisfactory; that in making new sanitary machinery before passing a new sanitary law we have put the cart before the horse. This opinion may, however, be regarded as that of sanitary authorities who want to lay down an entirely new system. Mr. Michael proposed strong measures. He was for superseding existing authorities, and appointing a Minister of Health, with a council, which, under the check of his responsibility, should have very large powers. The paper was so generally approved by the section that a special resolution was passed asking the council to print it, not merely in the Transactions, but for circulation.

A lively discussion took place in the section presided over by Sir John Coleridge. The room of the Athenæum, which is Greek in form, arrangement, and ornamentation, was crowded. The Rev. John Stock, LL.D., of Devonport, read a paper in which he set forth the arguments for establishment of an international tribunal to settle all disputes between nations, and cited examples from ancient history and modern experience to prove its possibility. Mr. R. N. Fowler, M.P., said that he could see no possible practical result which would ensue from it; that England had emphatically shown her disposition for the peaceful settlement of international disputes; and it was in France, Germany, and Russia that the peace agitation needed to be carried on.

In the Education section, Mr. T. Chatfeild Clarke, of London, read a paper, in which he strongly advocated the plan he has urged on the School Board of London—that of the establishment of a national training colllege, in which the students should board with their parents, or in lodgings, and in which the teaching and training should be common to persons of all denominations; the Government merely to provide the building, and a grant to Queen's scholars to be spent partly in education, partly in maintenance. Mr. G. W. Hastings delivered an address on Education, in the course of which he said he attached great importance to the teaching of science in all schools. By scientific teaching, he meant the development of the powers of observation and the training of the understanding, and not merely the accumulation of a number of scientific results. It produced habits of careful thought which were invaluable, and by cultivating a spirit of inquiry, they taught the child to examine for himself, and thus educate himself. They were incentives to adult education and prolonged activity.

Questions as to taxation, evidence, &c., were discussed in other sections; and in the evening a working men's meeting was held in the Albert Hall, Lord Napier and Ettrick in the chair. It was well attended, and addresses were delivered by Sir John D. Coleridge, Sir John Bowring, Dr. Acland, Mr. Morrison, M.P.; Mr. Hastings, and others.

The Mayor of Plymouth (Mr. I. Latimer), received the members of the Association in the evening, at the ball-room, Royal Hotel, which was decorated for the occasion. The company was very numerous, and the visitors were hospitably entertained by the mayor and mayoress.

Saturday was not quite an "off" day at the meetings, but it was a kind of half-day. The sections met in the morning, and in the afternoon the members generally made some pleasant excursion. There was rather more sight-seeing than business. Some of the sections were prematurely deserted; for there was a trip to Mount Edgcumbe at two o'clock, and the Mayor of Plymouth had asked those who wished to see the Town-hall and Assize Courts to meet him and the architect there at half-past twelve. The visitors noted the grouping of the new municipal buildings, which are rising in the centre of the town. The new buildings have been arranged in two blocks, with a wide space between them, so that they form a kind of quadrangle, of which St. Andrew's Church and tower form one end. The new buildings form each a side, and the remaining side is an open street. The buildings are in the Early Pointed style, and are constructed of granite and Devonian limestone, with Portland stone facings. On one side are the municipal buildings, with council-chamber and needful offices for town business; on the other side is the great hall, to seat 2,500 persons, and two smaller halls, for assize business, with all the usual appliances of police and assize courts. This building has a tower 180 ft. in height. These buildings, it appears, will be paid for out of the profits of the water-supply, which is in the hands of the corporation, and from other sources of existing revenue, and will not add a farthing to the borough rates.

The visit to Mount Edgcumbe, in the afternoon, wanted nothing but fine weather to make it one of the most delightful excursions the Association enjoyed.

A good deal of business, however, had been done in the morning, before the pleasure. In the Municipal Law Section, an important paper

"On the Transfer of Land," of which we give a separate abstract, was read by Sir R. Torrens, M.P. The address of the day, in the Repression of Crime Section, by the president of that section, Mr. Kennaway, M.P., was a careful review of the position of the criminal question as it was left by the Prison Congress which lately met in London. Mr. Kennaway anticipated nothing but good from a congress in which the representatives of some four-and-twenty nations or governments were assembled, and which enabled them to compare criminal systems through the agency of the very men who administer them; but he strongly dissented from some of its conclusions. It thought only of the criminal, and overlooked society. Mr. Kennaway maintained, amid the apparent sympathy of his audience, that we have not only to consider the reformatory effect of punishment on the 30 per cent. of the perpetrators of crime who are discovered and punished, but must also look to its deterrent effect on the 70 per cent. who are never found out at all. He also pleaded for the employment by Government of the convicts in such work as that carried on at the Pimlico factory, and feared that now Portland Breakwater was finished, and the works at Chatham were drawing towards completion, there would be difficulty in finding work to keep the convict establishments going.

Mr. George Smith, of Coalville, near Leicester, of whose efforts on behalf of children employed in brickfields we have before spoken, read a paper in one of the sub-sections on Economy and Trade, on the imperfect protection which is still given to such children. He declares that owing to insufficient provision for inspection the Act of 1871 is nearly a dead letter. Children at and under eight years of age are very extensively employed in the manufacture of tiles, which is actually worse in its laborious character and its unhealthy nature and its demoralising associations than brickmaking itself, and the evasion of the law is practically unpunished. The Act allows the Home Secretary to make exceptions, and Mr. Smith states that such exceptions are made without regard to the interests of the children and on the representations of manufacturers. One of his statements gives a curious example of evasion. Before 1871 the tile manufactories were regulated by the Act of 1864. That Act applied to "ornamental tiles," and the makers of such tiles escaped by calling them plain tiles. The Act of 1871 has put plain-tile factories under more severe restrictions than the others, and they have, therefore, changed their definition, and obtained leave from the Home Office to be regarded as ornamental tile manufactories. It is, however, not the tiles that have changed—only the name.

Mr. Henry Dunant, of Switzerland, founder of the "Red Cross" and of the Convention of Geneva, read a paper in one of the sections in which he made a proposal for introducing among the civilised Powers a High Court of International Arbitration with a view to avoid war.

In the Health Department a paper was read by Mr. Christopher Bulteel, F.R.C.S., "On Some of the Provisions of the Public Health Act of 1872, with special reference to Plymouth, Stonehouse, and Devonport;" and Mr. Symington read one "On the Method of Dealing with Sewage proposed by Mr. Strong, of Glasgow." The principal feature of the system consisted in the interception of each kind of sewage in detail at its source, by means of an apparatus designed for the purpose, which retained for separate removal all the polluting matter, and allowed only the water in a harmless condition to pass into the sewers. The system had been practically tested, and had been found to work satisfactorily. It secured the entire exclusion of all noxious matters from house drains and sewers. One of the chief recommendations of the plan was its extreme simplicity, and the facility with which it could be applied to existing arrangements.

In the Economy and Trade section, Mr. Jeremiah Head read a paper on the subject of "Retail and Co-operative Supply Associations." He said he considered that the gentlemen who recently waited on the Chancellor of the Exchequer to complain of civil servants carrying on co-operative stores were protectionists. They afforded an example of the way in which men lost faith in a true principle if for a time it seemed to operate to their disadvantage. Consumers encouraged the multiplication of shops, from a mistaken notion that competition would reduce prices. Notwithstanding the multitude of retailers, the cost of distribution was seldom less than 20 per cent. on the wholesale prices, whilst the co-operative associations were able to distribute for less than 5 per cent. He believed that if three-fourths of the existing shops were abolished, the remainder could do the whole retail trade of the country at a proportionately cheaper rate. The remedy for the existing waste of capital and energy was the extension of the co-operative system. The importation of sentimentality into any economic question was as mischievous as indiscriminate charity had been found to be. There was no public obligation to support more distributors than were necessary, especially when there was an outcry for more producers.

Dr. Littleton, late assistant-surgeon R.N., read a paper on "A New Method of Constructing Ships, with a self-regulating power as to their specific gravity, so as to enable them to secure the advantages enjoyed by fish." The numerous and disastrous accidents, he said, which had recently happened to several of our iron-clad fleet must have occasioned great anxiety to every patriotic Englishman, and it became a question of the deepest interest to discover whether means could not be devised to avert such calamities. Dr. Littleton then spoke of the difficulties to be overcome, and explained the manner in which he hoped he had met most of those difficulties, referring to a model of his new ship, which was placed on the table. The specific gravity of the whole bulk of a ship and her cargo was diminished by the temporary inflation of collapsible air-cavities fitted on the outside, so as to enable the ship to float in a less draught of water, and thus enter a bar harbour or disengage herself when aground, or prevent her sinking after springing a leak. There might also be air-cavities within,—incompressible air-tubes,—and compressible tubes.

On Monday the Congress adjourned to Devonport, and there seems to have been no falling off in the number of persons attending it. The arrangements at Devonport were, in most respects, as convenient as those at Plymouth.

The event of the day was the address of Dr. Acland as president of the Health Department. A crowded audience assembled to hear it, and Dr. Acland held their attention for more than an hour and a half. The address was extempore, and perhaps the most important part of it was the eloquent vindication of the sanitary legislation of last session. Dr. Acland began by illustrating the nature of international sanitary inquiries, and showed how elaborate investigation in diseases in one part of the world benefited the whole human race. After showing how intimately the physical health of a nation affected its mental wholeness and vigour, Dr. Acland came to the question of sanitary administration. He had made a list of twenty-nine departments of such an administration, and in answer to Mr. Vernon Harcourt's joke that if experts had their way they would regulate the cut of an old woman's flannel nightcap, said that the duty of Government was to do whatever was needful to health which a poor man could not do himself, and to leave to the people's own care whatever was within their own power. Pure air, pure water, pure food, means of recreation and rest, hospitals, and, more than all, education, were to be looked after by Government. Dr. Acland would not have these things centralised. Looking at the inevitable course of affairs in this country, health administration ought to be conducted by the people themselves. Local government had made England what it is, and Mr. Gladstone had done right in committing the England of the future to the same bodies and the same organisation which had in the past made it what it now is. He rejoiced that Mr. Stansfeld had, with rare modesty and sagacity, created a real administration of the public health, and he believed that, in spite of all that had been said, there was under the Bill of last session ample power to appoint experts as referees in all needful cases. These experts should not be men who had failed in their professions, and who wished to have the care of a Government salary; but the highest men in each branch, paid, not by salaries, but by the piece, by fees for each particular reference. So far from the Health Bill being a mutilated Bill, Dr. Acland thought it was sufficient for present needs. "I earnestly desire," he said, "that there should be no Public Health Bill next session. Sanitary machinery we have, but sanitary law we shall only get as the working of that machinery all over the country shows us what provisions are needful, and what are incapable of enforcement."

The Health Department was otherwise occupied with sewage. Mr. Hope read a long paper on sewage irrigation, in which he insisted that engineers blundered in laying out sewage-farms like water-meadows, and insisted that not a drop of sewage should run off the ground, but all be made to percolate through it. Mr. Siller described the successful operation of what is called the A B C process, as carried on by the "Native Guano Company."

A large meeting of the National Association for Promoting Social Progress in India was held after the business of the day, and the Mayor of Devonport, in the evening, gave a splendid reception to a large number of members of the Congress.

At the meeting in the Devonport Mechanics' Institute, on Tuesday, the address of Sir John Bowring, the President of the Economy and Trade Department, opened the proceedings. In it the present position of the agricultural labourer formed one of the principal topics of observation.

The Health Section had an interesting discussion on the present position of the town of Birmingham. Mr. Hope read a paper on the rejection by the House of Commons of the Birmingham Sewage Bill on the third reading. Birmingham has hitherto thrown part of its sewage into its river, but received some time ago notice that it must cease to do so. Thereupon the corporation undertook a long and expensive inquiry into the best mode of dealing with it, and adopted a double system, by which a great part of the sewage is kept out of the sewers, and taken away in carts. The part which could not be thus dealt with, was by the Bill to be made use of on a large sewage farm in the neighbourhood. The Bill empowered the purchase of this farm, and it was opposed by Sir R. Peel and Sir C. Adderley, on the ground that it would be a nuisance to them. Their opposition failed before the Select Committee; but the House itself yielded to them, and threw out the Bill. The corporation are under a Chancery injunction not to put their sewage in the river, and Parliament forbids them to put it on the land. They cannot obey the injunction, and Mr. Hope says that the Court has issued a sequestration of the corporation revenues; that in November next a receiver will be appointed; and that local self-government in Birmingham will cease. It is a dead-lock, and all that the section could do was to suggest to the council that a copy of Mr. Hope's paper should be sent to the proper department of the Government.

To the Tuesday's proceedings in the other sections we have no space to refer.

In the Economy and Trade Section, Mr. G. J. Holyoake read a paper "On the Abuse of Industrial Partnerships."

On Wednesday, the concluding general meeting of members and associates was held at the Mechanics' Institute, Devonport. The chair was occupied by Lord Napier and Ettrick.

Several excursions took place in the afternoon. The Gun-wharf, Keyham Steamyard, and the Devonport Dockyard, were open, by permission of Admiral Hall, to members and associates, and at the latter hour steamers conveyed the excursionists to the Breakwater, the River Yealm, and Port Eliot.

On Thursday a party, limited to fifty, by invitation of the Duke of Bedford, were to visit Endsleigh, his grace's seat. There was also to be an excursion to the Eddystone Lighthouse.

The Council have accepted an invitation to meet next year at Norwich, and recommend Glasgow as the place of assembly in 1874.

THE IMPROVEMENTS AT LINCOLN'S INN.

EXTENSION OF THE LIBRARY.

THE enlargement of the Library at Lincoln's Inn, which has for some time been in progress, under the superintendence of Sir Gilbert Scott, the architect, is now nearly completed. The building has been extended a considerable distance eastward, which admits of a largely-increased space in the Library as well as the dining-room of the Hall. In carrying out the extension, the architectural features of the original building have been adhered to, the added portion not only resembling the old in every main feature, but, so far as was possible, the materials, including the brick and stone work of the east end of the building, were carefully preserved, and have again been used in the enlarged structure. This particularly applies to the stonework of the large eastern window, the whole of which, after being removed, has been replaced in the extended building, and now pre-

sents precisely the same appearance as it did before its removal. Carved arms, escutcheons, and armorial bearings, in stone, uniform with those in the original building, are displayed outside the structure in the spaces between the lower and upper windows of the added portion. A distinct and additional architectural feature has been imparted to the building by the erection of an octagonal tower at the south-east angle. The materials used in the construction of this tower, up to the eaves and parapet wall of the main building, are uniform with the main building itself, being of red brick, with stone facings. From this point the tower is carried up, entirely in stone, to an additional height of about 15 ft., the stonework being carved. The extreme height of the tower is surmounted by a spire, from 12 ft. to 15 ft. high, terminating in a vane. The spire, which has been finished during the present week, completes the external features of the enlarged building.

In connexion with the enlargement of the library, it may not be out of place to notice the memorial gates which have recently been erected at the south end of the gardens of the hall in memory of the late Colonel Brewster, formerly Colonel of the Inns of Court Rifle Volunteers. The fabric of these gates, which was designed in Belgium, is exceedingly light and ornamental. They consist of a large central gate, and two smaller side-gates, and are formed mainly of screen work representing memorial flowers. On the top of the central gate are the deceased Colonel's arms, together with his name and date of his death, whilst on each of the other gates is the monogram of the Inns of Court Volunteers.

Considerable alterations and building improvements are about to take place in Lincoln's Inn immediately opposite to the east end of the library of the Hall. It is intended to take down the whole of the buildings on each side of the square, known as the Old Buildings-square, and erect upon their site new chambers of an architectural character. New chambers of a similar character are also about to be erected on the western portion of the square itself, having its frontage to Lincoln's-inn Hall, and within the last fortnight these have been commenced. When the new chambers now in course of erection in the square are completed, the old buildings adjoining will be taken down, and new chambers erected on their site.

THE GAS QUESTION IN LONDON AND THE PATENT GAS COMPANY.

UNDER the auspices of the London Gas Consumers' Association, a series of public meetings is being held in various parts of the metropolis, the objects of the meetings being, *inter alia*, to secure gas of improved quality at a reduction in price of from 3s. 9d. to 2s. 9d. per 1,000 cubic feet; and to take steps to place the gas-lighting of London in the hands of the parochial authorities, so that the profits may be applied to the reduction of taxation upon the plan adopted in Manchester, Glasgow, Leeds, Dundee, Rochdale, Bury, Aberdeen, and numerous other cities and towns. In connexion with this series of meetings a second lecture was delivered by Mr. G. Flintoff, C.E., in Exeter Hall, on Tuesday evening last. The lecturer stated that the annual cost of gas in the metropolis last year exceeded 2,200,000*l.*, being 165,000*l.* more than in the previous year, showing that the consumption was increasing at the rate of doubling itself in about ten years. In Manchester the corporation supplied cannel gas at 3s., and on a rental of 212,645*l.* applied 65,343*l.* to public improvements and the reduction of local taxation. If the lighting of London could be vested in the local authorities they would have a profit of at least 750,000*l.* per annum to dispose of for the advantage of the public. The London consumers had a right to demand gas of a much more pure and of higher illuminating power than that supplied to them, and at a price not exceeding 2s. 9d. per 1,000 ft. Eighteen-candle gas could be sold in London at a profit at 2s. 6d. per 1,000. The London gas was not only very bad in quality, but it was 40 per cent. dearer than in most of the other large cities and towns in the United Kingdom. That better gas could be supplied at a profit at a much lower price, was easily demonstrable. At Walsall, eighteen-candle gas was supplied at from 2s. 2d. to 2s. 6d. per 1,000, and this left a profit sufficient to light the street-lamps without charge to the public. The South Metropolitan Gas Company sold gas of excellent quality at 3s. per 1,000, in a thinly-populated district; but the Ratcliffe Gas Company, that lighted a densely-crowded part of London, charged 4s. 3d. per 1,000. The consumers had no redress, as the "districting" system had destroyed competition. They must take such gas as the company that had the supply of the district provided, and must pay for it what the company demanded, or go without. It was vain to seek legal redress as the companies could apply, without stint, the ample funds they had from violation of the Acts of Parliament that should bind them but did not. It was the interest of the local authorities acting on behalf of the ratepayers to apply to Parliament at once for an Act to enable them to buy up the existing companies at their fair market value. The directors would oppose this, as, in addition to their dividends, they paid themselves from 4d. to 8½d. for every 1,000 ft. supplied to consumers. The directors of the 3s. gas company had 5½d. on each 1,000 ft. supplied, and divided 10 per cent., which showed that gas could be sent out in London at 2s. 6½d. per 1,000 ft. Important improvements had been effected in gas-making, and the public had a right to demand that the gas companies should adopt them, and give their customers the benefit. It was grossly unjust that the public should have to pay for inefficiency in their business, and profligate extravagance, that did not belong to and would not be suffered to exist in connexion with any other kind of business or manufacture. He thought the directors of the London gas companies should be sent to East Barnet to learn their business. He had been himself asked to go there, which he did with a mind prejudiced against the process of the Patent Gas Company. He found, however, that it was a great success, and that the invention of the company was one of immense value. He felt certain, that whether adopted or not by the London companies, the system would speedily find its way into the provinces and abroad. With the same quantity of the ordinary gas coal from which the companies made, by the common process, ten and twelve candle gas, the Patent Company made the same quantity of gas of eighteen-candle illuminating power. The adoption of the process would be an immense boon to customers. The South Metropolitan Company, it appeared, from the *Journal of Gaslighting*, was about to give the Barnet system a trial on a working scale, having first made experiments, with which they were satisfied. The value of the process was readily apparent by a simple proportion calculation. If 9,000 ft. of twelve-candle gas, made from a ton of common gas-coal, is worth, say 3s. 9d., or 3½d. per 1,000 ft. per candle, what is 9,000 ft. of eighteen-candle gas worth? The answer is, 5s. 7½d. The extra cost of manufacture by the patent process was ½d. per 1,000 ft.; and supposing the company were to charge, say 1d. per 1,000 ft. for the right to work the patent, this would make the net increased value per 1,000 ft. by the patent process 1s. 9d., or an increased value upon the production of gas from a ton of coal of 15s. 9d. But this was not all,—the gas companies making by the ordinary process are obliged to use from 10 to 12½ per cent. of cannel gas, at 30s. per ton, to bring their gas up to even the low standard of twelve candles. This is equal to an addition of 3s. per ton on their coals all round, or a difference in favour of the Patent Company's process of 18s. 9d. in the value of the gas made from a ton of coal. This saving upon the consumption in the metropolis would amount, according to the lecturer, to no less than 735,000*l.* per annum.

BUILDING ON THE MILKWOOD ESTATE.

THE activity in building which has been going forward within the last few months on the estate which is known by the above name, and which is situated between Denmark-hill and Herne-hill, and bounded on the south-east by the Chatham and Dover Railway, is a striking instance of the new suburban neighbourhoods rising up in succession in different places around the metropolis. About the present time last year the greatest portion of the land forming the estate was occupied as market gardens, but the entire area has now been laid out in wide and spacious streets, all drained and paved, and provided with ample footpaths, and upwards of two hundred private houses and shops have already been erected and occupied, whilst a large number of new dwellings are at present in course of erection. The principal street on the estate, which has been named Milkwood-street, is a spacious thoroughfare of about one mile in length, running parallel with the railway direct to Herne-hill, and having an outlet close to the railway station there. This street is intended to be the main business thoroughfare of the locality, and a large number of houses and shops have been built and occupied by tradesmen in different branches of business, whilst several other blocks are in course of erection.

When entirely built upon, it is estimated that the number of houses and shops on the estate will be about 800, with a population of not less than 4,000. The streets have been laid out by Messrs. Habershon & Pite, architects, of Bloomsbury, and the premises erected on the estate are subject to their approval.

THE LATE MR. THOMAS RIDER.

MANY of our readers will learn with regret of the decease of Mr. Thomas Rider, of the firm of Messrs. Rider & Son, builders, Union-street, Southwark, which occurred on Saturday last, the 14th instant, after a brief illness, we believe in his seventy-first year. Mr. Rider was the son of a builder of the same name, who by his industry and integrity raised himself from a humble position to one of credit and independence. His son was, as was usual in those days, apprenticed to his father, and served his time at the bench: he thus acquired a knowledge of the details of his business which was of the greatest importance to him in after-life. He had an extensive business, chiefly in the City of London, and was employed by many leading architects, by whom he was deservedly respected, from his scrupulous integrity, and the attention and practical knowledge he brought to bear upon business intrusted to him. Among the more recent buildings erected by Mr. Rider are the Freemasons' Hall and Tavern, Great Queen-street, under Mr. F. P. Cockerell's superintendence; and the premises of the British and Foreign Bible Society, from the designs of Mr. I'Anson.

REPORTED NEW COAL-FIELDS IN WEST LANCASHIRE.

IN the present dearth of the coal-supply, and the almost unprecedented high price of that commodity, any facts leading to a belief in the prospect of new sources of supply must be received with unmixed satisfaction. It is now stated that Mr. Edward Young, a mining engineer and geologist of Oughtifield, near Sheffield, says he has convinced himself of the existence of coal-fields in West Lancashire to the extent of from 400 to 500 square miles. Mr. Young's conviction is that the coal measures commence in the neighbourhood of Southport, and extend to Liverpool on the one side, and from Southport to Preston and Lancaster on the other. These districts, it must be borne in mind, embrace nearly the whole of south-west and north-west Lancashire, where coal has never hitherto been found, the existing Lancashire coal-fields having been mainly confined to the eastern portions of the county. It is also to be noted that the distance between the respective points in which it is now alleged coal is to be found is very considerable, the distance between Southport and Liverpool being upwards of 20 miles on the one hand, whilst between Southport and Preston and Lancaster, on the other hand, it is no less than 40 miles, thus giving some idea of the large area in which it is now asserted that coal is to be found. We learn that a number of persons interested in coal discoveries share Mr. Young's opinion that there is coal in abundance in the districts named; and it is stated that a meeting of landowners in West Lancashire is shortly to be held in Preston, at which Mr. Young will attend, and explain the reasons which have led him to the opinions he has formed. It is further said that several landowners have already announced their intention of contributing towards the large expense which boring operations will involve. A new railway, called the West Lancashire Railway, is about to be constructed from Southport to Preston; and in the event of coal being discovered in the locality, it must materially add to the prospects of the undertaking.

Mr. T. Mellard Reade, of Liverpool, writes to the same effect, suggesting that it is worth consideration whether or not Liverpool people should try the experiment of sinking for coal under their feet. His letter goes into many particulars, which are interesting

to geologists, and essential for the substantiation of his argument. If coal is to be bored for by the Liverpool people in the neighbourhood, it should be on a spot where the lower red sandstone is thrown up to the surface. This being done, the depth to which they would probably have to bore before reaching coal would be 400 ft. or 500 ft. This would be in the upper members of the coal measures. Twelve hundred feet lower would bring them to workable coal, in the beginning of the middle measures; and such a depth as this is very slight compared with those which have been canvassed in estimates of the increased difficulty and costliness of meeting the industrial demand for fuel. The trial would not be a very perilous or extravagantly costly one. There have been previous attempts made, but they were on wrong spots, and bored wrong *strata*. Mr. Reade is for making the trial through the soft red sandstone by sinking a shaft near a fault.

THE VIENNA UNIVERSAL EXHIBITION, IN 1873.

THERE are many reasons why the United Kingdom should make an effort to be well represented in this approaching Exhibition, and we shall willingly do what we can to assist in bringing about such a state of public opinion as may lead to this. Other nations co-operated cordially with us in our Exhibitions of 1851 and 1862, to which we owe much; and it is but right that we in our turn should respond to their calls. Apart, however, from this, selfish motives point the same way. Foreign countries, we may even say all industrial states of the world, evince the greatest interest in this forthcoming Exhibition. In the East, as well as in the West, extraordinary preparations are being made to be well represented there. The East, more particularly, is desirous of sending its productions lavishly, and will make every exertion to compete successfully with the West. It is, therefore, highly desirable, and the wish of her Majesty as expressed in the Royal Commission, that England and her colonies should be well represented in art, science, and manufactures. The importance of the approaching Exhibition at Vienna can scarcely be over-rated, considering the essentially civilising influence of these gatherings. Hitherto these exhibitions have occurred only in the great centres of civilisation in the west of Europe, whereas the present Exhibition will take place on its extreme eastern borders. To the east of Austria there is a population of some twenty-four millions of semi-civilised peoples of European Turkey, including the Danubian Principalities, who in view of the considerable extension of railways in progress into those distant parts through Hungary and Transylvania, will have an opportunity not before known of largely benefiting by a more immediate contact with the Western civilisation in arts and sciences, in commerce, social habits, and customs. Besides that the great ends of national economy, of industrial and commercial speculation, will be greatly furthered by this enterprise, there is also a political importance attached to this Exhibition.

Looking back upon the results that have accrued to Great Britain and France from the Exhibitions of 1851, 1855, 1862, and 1867; the immense influx of strangers from far and near, the widened sympathies, the assimilation of new ideas and of foreign languages which resulted, it will be easy to conceive that the effects on the East of an Industrial Exhibition in the Austrian capital can hardly fail to be much greater even than those realised in England and France. Hitherto the sympathies with this Exhibition have been rather lacking, it would seem, in England, and yet British interests are deeply involved. There is a vast market to be opened in European Turkey for agricultural implements, machinery of all kinds, cheap cloths, hardware, and many other British manufactures, and enterprising capitalists would do well to direct their attention to the almost countless mineral treasures yet unexplored in Transylvania.

The situation of the Exhibition Palace is admirable, lying in the heart of a park unsurpassed for beauty by any in Europe,—the Prater. The area apportioned to the Exhibition will embrace from four to five English square miles. The covered space available for the Exhibition will be about 1,150,000 square feet, being considerably more than that occupied by the Paris Exhibition of 1867. The Exhibition building will be 905 mètres long by 205 mètres wide. We give a plan of the site and a view of the central building. There will be a main gallery or nave intersecting the whole edifice. This gallery has cross galleries or transepts on each side, which are so placed as not to obstruct the view from either end. Between the transepts and the nave lie the garden-courts, which will also be available for exhibition purposes, and each country will have one or more of these transepts allotted to it, together with the portion of the nave and the garden-court adjoining. A rotunda, shown in our view, will rise from the centre of the building, and divide the main gallery in the middle. This rotunda, when finished, will be the largest canopy-shaped edifice without supports which has ever been erected. It has a diameter of 102 mètres, and its height is 79 mètres. The whole is being constructed of iron, after a design by Mr. Scott Russell.

The main gallery will be 25 mètres wide, and each of the transepts 15 mètres wide and 75 mètres long. The latter are separated by courts, which are designed for such objects as can be exposed in uncovered places. The number of square mètres within the Exhibition building will amount to 103,000. East of the Prater Rondo, facing the main gallery, the Art Exhibition building will be erected, covering an area of 6,995 mètres. Buildings of a permanent character, sufficiently protected, will be provided for the exhibition of works of fine art.

From the chief building covered galleries lead to a large conservatory, and to smaller pavilions which are intended for the exhibition of horticultural productions, aquariums, &c. A separate hall will be erected for machinery in motion, 890 mètres in length, and 28 mètres in width. In this hall will also be found hydraulic machines, diving apparatus, &c.

The Imperial Villa and the hall in which the jury will deliberate and make their awards will also be erected in the grounds, which will be laid out under the direction of a landscape gardener of great reputation.

Amongst other attractions, the council of the Exhibition have decided on having a permanent aquarium of considerable magnitude erected in their city, and plans have been submitted to them for their approval. Their choice of an architect has fallen upon Mr. Charles H. Driver, who planned and erected the aquarium at the Crystal Palace last year, and the works will be forthwith commenced.

Machinery, we need scarcely say, will form an important feature of the Exhibition, and we would call the attention of English manufacturers to the opportunity afforded to exhibit either fixed steam-boilers, fixed steam-engines, or portable engines, and also steam-engines and steam generators for service in the machinery hall. Machinery and apparatus specially adapted to the requirements of the Exhibition may also be supplied by exhibitors; and exhibitors supplying such machines and apparatus intended for special service during the Exhibition will enjoy special privileges, to be arranged between them and the director-general. If British makers lend cranes, hoists, boilers, and engines for use of British exhibitors, no fees will be levied by the Imperial Austrian Commission for the use of the same by British exhibitors; but if British exhibitors lend such machinery for the use of foreign exhibitors, arrangements will be made by the Austrian director-general to indemnify British exhibitors for the use of their machinery. The power required to set machinery and main shafting for driving machinery in motion will be supplied by the Austrian Commission, and exhibitors will in no case be charged for motive power supplied by the main driving-shafts in the machinery-hall.

Coals from the best Austrian and Prussian coal-mines, and feeding-water for boilers, &c., supplying steam-engines driving machinery in the machinery-hall, will be supplied by the Austrian Commission free of expense. Stokers will also be provided for the steam-boilers lent for service in the Exhibition; or, if the exhibitor should prefer to employ his own people, the wages of the latter will be paid by the Austrian Commission according to a fixed tariff.

The whole Exhibition-ground will be drained by a system of drainage-pipes, carrying water and liquids to the Danube, and every measure has been taken to have a sufficient supply of water in all parts of the Exhibition. Gas will be furnished by the Imperial Continental Gas Company, at the usual pressure.

There will be some work of importance to be done by steam road-rollers, and, in case of any work performed for the installation by traction-engines or road-rollers, all expenses will be paid by the Austrian Commission. There will be competitive trials with steam fire-engines, and the jury and exhibitors are invited to send special engines for this purpose; such engines will be considered as objects of exhibition, and, if lent for use, fuel and care will be at the charge of the Imperial Austrian Commission. There will likewise be special trials held with agricultural machinery and implements, in fields in the neighbourhood of Vienna, or in such places as can be easily reached by the Exhibition railway. Agricultural machines will not be exhibited in the machinery-hall, but in a pavilion specially built for that purpose.

All machines intended for the Exhibition, will be admitted to the machinery-hall, from the 1st of February till the 15th of April, 1873, inclusive, and must be set up by the 25th of April.

Machines and apparatus arriving in pieces, and consisting of heavy and bulky parts, must be set up by the 15th of April.

Slate is particularly desired to be sent to the Exhibition: the slate will stand a chance of being sold with advantage at the close of the Exhibition, the Austrian slate being only fit for roofing.

It is also desired by the Director-General that fittings, show-cases, cloth for the covering of walls, window-glass, &c., should be sent from England to Vienna: these would be considered as Exhibition objects, and sold at the close of the Exhibition.

Some time ago her Majesty, in pursuance of an invitation received from the Austrian Government, appointed a Royal Commission for the purpose of representing the British and Colonial exhibitors; and these commissioners have already held several meetings, and established their offices at 41, Parliament-street, where Mr. Philip Cunliffe Owen, the secretary, will receive applications for space, and give every information as to the forwarding, exhibiting, and returning of the objects of the Exhibition, in accordance with the regulations laid down. The Exhibition will be opened on the 1st of May, 1873, and closed on the 31st of October of the same year.

British exhibitors can communicate with the Austrian Commission solely through the Commission appointed for Great Britain and the Colonies.

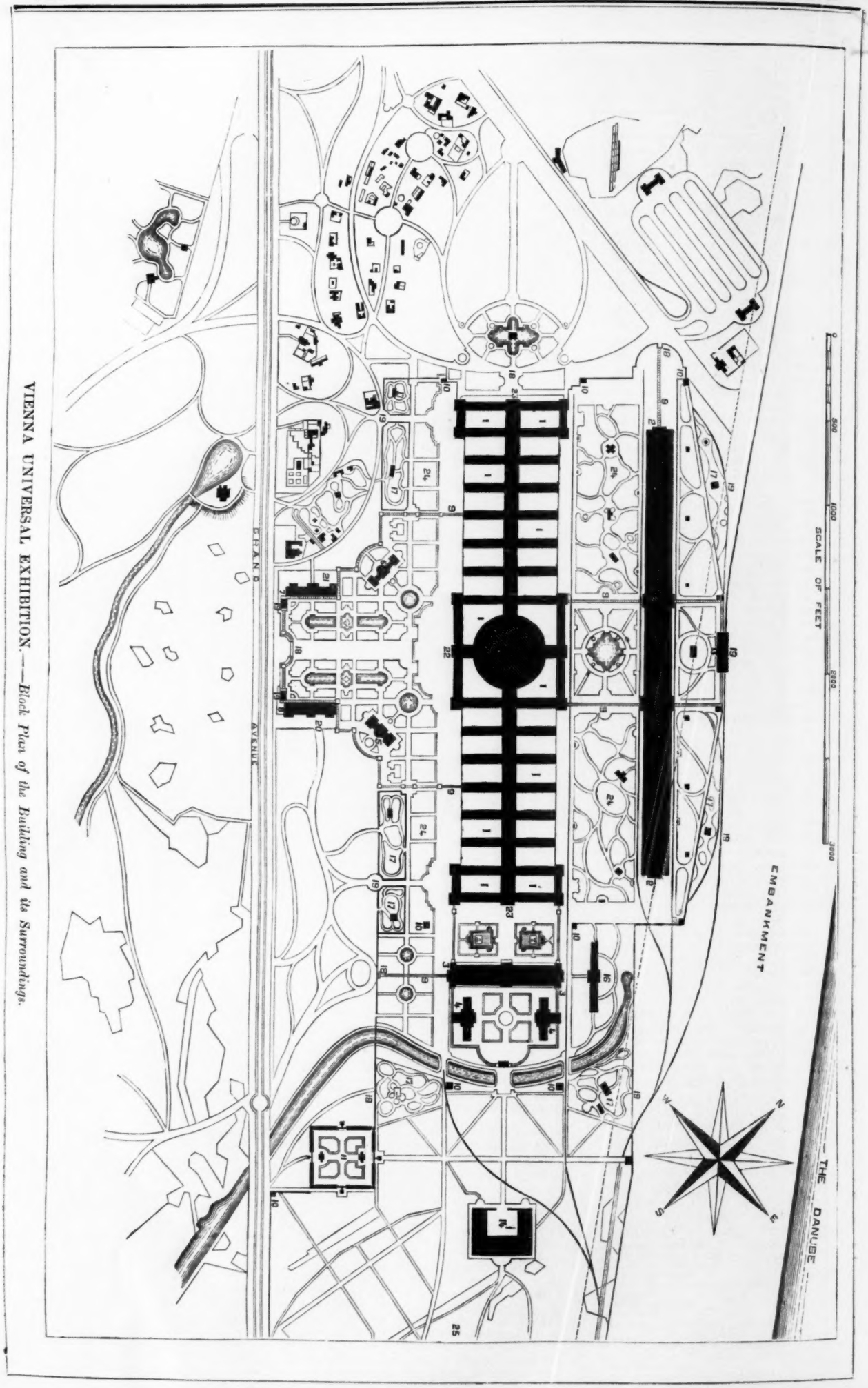
Lists of the intended exhibitors of the United Kingdom and the Colonies, as well as detailed plans, showing the space allotted, and of each single object to be exhibited, must be sent by the Royal Commission to the Director-General, Baron Schwarz, before the 1st of January, 1873, at the latest, so that the exigences of the respective countries may be taken into account in organising the interior arrangements of the Exhibition buildings. As the total demand for space must depend upon the number of individual applications received, it is desirable that applications should be forwarded without delay to 41, Parliament-street.

The Director-General has entered into negotiations with the different railway and steam navigation companies of Austria and Hungary, and procured a considerable reduction of rates for the conveyance of objects for the Exhibition, and several of the English railway companies have already agreed with a praiseworthy spirit to offer the exhibitors from the United Kingdom similar facilities: other companies have the matter under consideration.

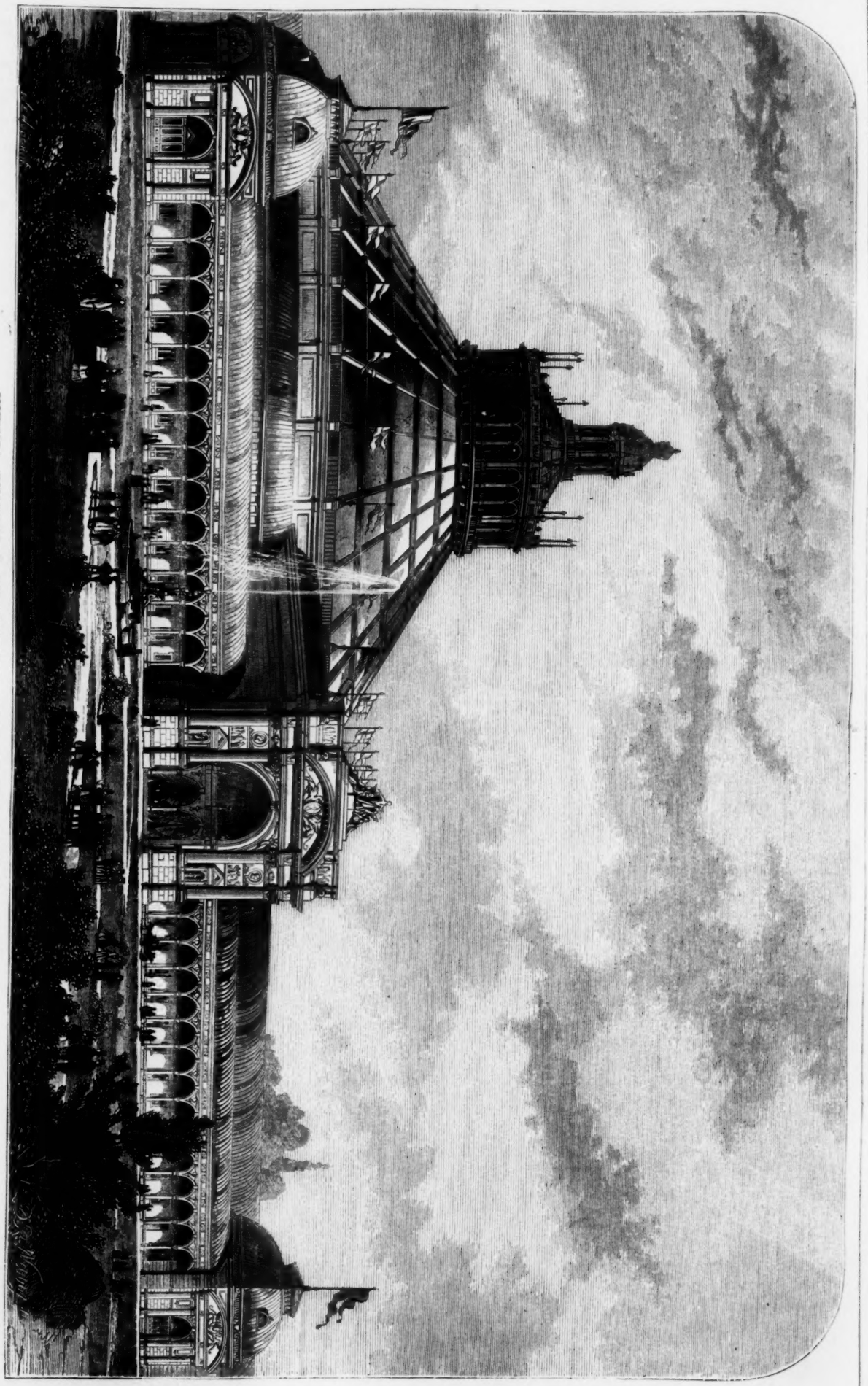
We will simply add, that the exhibitors of works of fine art are exempted from any charge for space.

REFERENCES.

1. Palace of Industry.
2. Machinery-hall.
3. Gallery of Fine Arts.
4. "Exposition des Amateurs." (Loan collection.)
5. Imperial Pavilion.
6. Offices of the chief manager.
7. Pavilion of the jury.
8. Post, Telegraph, and Custom-house offices.
9. Galleries of communication.
10. Guard-houses.
11. Barracks for the I. and R. Engineers.
13. Exhibition railway-station.
14. Exhibition of horses.
15. Place for hothouses.
16. Place for Horticultural Exhibition.
17. Restaurants.
18. Principal entrances.
19. Lateral entrances.
20. Alley leading to the Imperial Pavilion.
21. Alley leading to the pavilion of the jury.
22. Principal entrance of the Industrial Palace.
23. Lateral entrance of the Industrial Palace.
24. Places for pavilions.
25. Park for the Agricultural Exhibition.



VIENNA UNIVERSAL EXHIBITION.—*Block Plan of the Building and its Surroundings.*



VIENNA UNIVERSAL EXHIBITION: VIEW OF THE CENTRAL ROTUNDA.

THE TRANSFER OF LAND.

SIR R. TORRENS, M.P., read a paper on the "Transfer of Land," in the Municipal Land Section of the Social Science Congress, at Plymouth, from which the following is abstracted:—

"The question of applying to estates and interests in land the principle of conveyancing by registration of title has frequently been discussed. I have undertaken to bring it again under review, with the additional light thrown upon the subject through the labours of the Royal Commission on the Land Transfer Act of 1862 (Lord Westbury's), and more recently by the Parliamentary returns, exhibiting the working of the corresponding Act in Ireland (Record of Titles Act, Ireland, 28 and 29 Vict.), and by the Blue Book, containing the reports of the governors of the Australian colonies, testifying the complete success of the same principle there, applied under a different method. I will commence by endeavouring to explain the radical distinction between 'conveyancing by deed,' and 'conveyancing by registration of title.' Title by deed can never be demonstrated as an ascertained fact; it can only be presented as an inference more or less probable, deducible from the documentary and other evidence accessible at the time being. This condition involves the employment of highly skilled, and therefore costly professional assistance. Secondly, an element of uncertainty through the admitted possibility of a wrong inference being drawn from the evidence even by the most skilful conveyancer (2), and from the difficulty of ascertaining beyond doubt that all the evidence is fully and clearly before him. Thirdly, this examination involves delay, sometimes such delay as entirely to frustrate the object of the party dealing; and, lastly it has the disadvantage of being cumbrous from the mass of documents that have to be preserved. In contrast to this, 'title by registration,' is a tangible ascertained fact. The entry in the record is conclusive. There is nothing to deduce or infer, or, in the conduct of ordinary dealings, to necessitate professional assistance. The time occupied in such dealings need not exceed that required for transacting the like dealings with railway scrip, or with property in shipping, and the instrument evidencing title would rarely exceed the size of a sheet of letter-paper. In contrast to this I would refer to the results of 'conveyancing by registration of titles,' of which we have a perfect example in this country, and in this great commercial port. You need not but walk down to the Custom-house, and there you may see an ordinary mercantile clerk, without any difficulty, and with perfect security, conducting transfers and mortgages of property in shipping, and the time occupied in thus dealing with a vast property, such as that of the Great Eastern, would not exceed half an hour. A few weeks back a friend of mine expressed surprise at meeting a gentleman, whose arrival from Australia was not expected for some months. 'Yes,' said this gentleman, 'it is all owing to that admirable act of your friend Torrens that I am here so soon. Only two days before the packet sailed, I had an offer for my estate. The intending purchaser went with me to the Lands Title-office, and in less than an hour the business was transacted. I got a cheque for the purchase money, and he got an indefeasible title to the land, and as we did the business ourselves, the cost was only 3*l.* or 4*l.*' Again, a gentleman residing at Launceston, Tasmania, writes to me as follows:—'Your Act has proved a great blessing to us here. Recently I purchased a sheep station for my son, and being 5,000*l.* short of the purchase-money, I mortgaged some land for the amount. The transaction was completed in less than half an hour, and as I did the business myself, the whole expense was only 15*s.*, which, under, the old law, would have been 20*l.* or 30*l.*, and I should have considered myself lucky if I got it done under a month or two.' Official duties connected with the transfer of property in shipping suggested to me, in 1850, the feasibility of applying the same method to dealings with land, though it was not until 1856 that, failing in my endeavours to induce any of my professional friends to take the matter in hand, I essayed what, to a mere layman, was a very formidable task, and brought out my scheme in the form of a bill—I confess a very defective one, as I too timidly followed the language as well as the forms of my model, the Shipping Act. This Bill, in an amended shape, was introduced into the Legislature of South Australia in 1857, and became law. In May, 1857, the Royal Commission on Registration of Title made their report, and two years later Lord Cairns, being then Solicitor-General, introduced into the House of Commons Bills to give effect to the recommendations of that report, which Bills, unfortunately interrupted in their course by a dissolution, never passed into law. As no portion of the method which I have been instrumental in establishing in the Australian colonies has worked with greater facility, or been productive of so great advantage to the community as that which relates to charges on land, I will here, as briefly as possible, describe that method. The old fiction of transferring the legal estate is abolished, and the object is accomplished by a direct instead of by a circuitous course. In the language of the Act, 'mortgage and encumbrance shall have effect as security, but shall not operate as a transfer of the land thereby charged, and in case default be made in the payment of the principal sum, interest, annuity, or rent charge thereby secured, or in the observance of any covenant, and such default be continued for the space of one calendar month, or for such other period of time as may therein for that purpose be expressly limited, the mortgagee or encumbrancee may give to the mortgagor or encumbrancer notice in writing to pay the money then due or owing on such memorandum of mortgage or of encumbrance, or to observe the covenants therein expressed, and that sale will be effected unless such default be remedied.' In such case the registered proprietor of the charge may proceed to sale, and should the sum bid be inadequate to cover the amount secured, he may foreclose without further expense or delay, by producing to the registrar evidence that the requirements of the law have been complied with. In either event, the registrar is required to register the proprietor of the charge, or his purchaser, as owner of the land. The Act further enables the proprietor of the charge, in such case, to distrain or enter into receipt of rents and profits. Charges are released by memorial entered on the appropriate folium of the register, and upon the certificate or other instrument evidencing title, which memorial the registrar is required to make upon production of receipt for the sum of money, annuity, or rent charge; or upon production of evidence of the decease of the annuitant; or that the circumstances or conditions upon the occurrence of which the charge was contingent, have ceased to be possible. These charges on land are transferable by endorsement in a simple form, printed on the back of the instrument, evidencing the charge, and as the title is indefeasible, they pass as freely as Exchequer bills between parties acquainted with the value of the property to which they attach. The expense attendant on creating a charge is but 10*s.*, the cost of transfer 5*s.*, and of release 5*s.* Equitable mortgages for the purpose of securing cash credit, and advances, for fluctuating amounts, and also when parties desire secrecy, are created under this system with a degree of security and facility for realising unattainable under the English law of conveyancing, because the title is indefeasible; and so long as the banker retains the certificate of registration of that title no dealing therewith can take place without his consent. Should the banker desire further to secure facilities for realising on the contingency of the death or insolvency of his creditor, he may require 'contract for charge,' duly executed on a prescribed printed form, to be deposited with the certificate, either specifying a fixed amount, or, as is more usual, for such sum as may prove due on balancing accounts at some future date, and on the occurrence of either of the events above referred to, he can, by presenting these instruments at the registry-office, convert his equitable lien into a registered mortgage. The amendments really necessary in order to render this Act of 1862 a true embodiment of the system of conveyancing by registration of title, so as to put that system fairly on its trial, may be compassed in a very few words. I will enumerate them in the order of their importance. First, abandoning the attempted compromise between registration of title and registration of assurances, to repeal Clause 63, which makes property in land to pass upon execution of a deed or instrument, and substitute for it the corresponding provision of the Australian Act, which declares that estates and interests in land shall pass or be affected by entry in the register; and instruments, when executed, shall have effect only as authority to the officer to make such entry, and as contract between the parties. Secondly, in order to facilitate the first placing of land upon the register, a relaxation of the stringency of the requirement of Section 5, so as to allow the recording officer to accept for registration "good holding titles," in the event of non-claim after services of notices and due advertisement. Thirdly, repeal of Section 14, in order to substitute the simple and effectual method of recording by one register-book, with instruments evidencing title to each separate estate or interest, upon the model of the Shipping Act, and as in operation in Australia; for the method by three register-books, with land certificates and special land certificates, as condemned by Colonel Leach and other witnesses, and admitted by Mr. Spencer Follet to be unsuitable for the conduct of business on such scale as would render it of sufficient public advantage. Fourthly, the abandonment of Section 32, so far as to exclude uses and trusts from being disclosed on the register.

Before concluding, the reader of the paper drew attention to a Blue Book, recently presented to Parliament, giving replies from the governors of the Australian colonies to a circular despatch of her Majesty's Secretary of State, calling for reports on the working and progress of the system of conveyancing by registration of title there in operation. The advantages derived from this system by the inhabitants of the colonies, he said, may be thus summed up. The procedure is so simple and ready of accomplishment that parties dealing for the most part transact their own business. A saving of 19*s.* in the pound sterling has been effected in the cost of conveyancing. The wealth of the community has been increased by restoring to its intrinsic value, as building sites, land, which, deprived of that special character by imperfect evidence and technical defects in title, lay waste and unprofitable. The value of land as a basis of credit has been raised by the extraordinary facility and security with which equitable mortgages and registered charges are effected, and the ease and rapidity with which the title may be transferred from hand to hand. Through the simplification of titles, so that each freeholder stands in the same position as a grantee direct from the Crown, the risks of Chancery suits have been reduced to a minimum, and a ready and inexpensive procedure in foreclosure and ejectment has been obtained. He earnestly desired to see those benefits participated in by the landowners of this country.

SCHOOLS OF ART AND SCIENCE.

Selby School of Art.—The first annual meeting of this school has been held in the Public Room, Selby, under the presidency of Sir G. Gilbert Scott, R.A. About a year ago an art class in connexion with the Science and Art Department, South Kensington, was established in this town, and has been so successful that the committee decided to commemorate the first anniversary by combining a *soirée* and an exhibition of prize and other drawings. They obtained the consent of Sir G. Gilbert Scott, to preside on the occasion; and contributions of works of art were so liberally offered, that a notable display was offered. So valuable a collection has never before been exhibited to a Selby public, and would itself be amply sufficient to form an instructive exhibition. In addition to this, the committee have been intrusted, by private owners, with some valuable paintings, which add greatly to the attractiveness of the exhibition.

Brighton and Sussex School of Art and Science. The fourteenth annual distribution of prizes to the successful students in connexion with this school has taken place in the Music Room at the Royal Pavilion. The Mayor, Mr. J. Cordy Burrows, presided. There was a very good attendance of the parents and friends of the pupils. In presenting the first annual report in which the Committee have had to record any proceeding in connexion with the Science branch, the Committee

"congratulate the subscribers to the institution and the public of Brighton on the great extension of their operations during the past year. It would be unjust [continues the report] if they did not state that this result is to be ascribed entirely to the capacity and energy of the head-master, Mr. Alexander Fisher. . . . . While there has been a moderate increase in the numbers, the improvement in results is much more marked.

The Committee regret exceedingly to state that the insufficiency of the accommodation afforded by the room in which the school is at present carried on has caused the number attending the classes to have been very much less than they would otherwise have been. The Artizan Class would probably nearly double its present numbers if there were sufficient space. The Committee will use their utmost exertions during the ensuing year to obtain improved

accommodation. To attain success in this object, the co-operation of the public, of the local authorities, and of the Government is necessary. That of the latter is certain, conditionally on the two former being afforded: and when it is generally known that, notwithstanding the high rank the town now takes, both in reference to population and as the residence of the wealthy and influential classes, it possesses no School of Science at all, and a School of Art most meagre in its appointments, and probably more circumscribed in its capabilities than any in England; that at a time when the need of education, and especially of technical education, is being so fully recognised, numbers in Brighton, anxious to acquire this education, are actually driven away from the doors of the school for want of sufficient accommodation—it is confidently hoped that the efforts of the Committee to establish a Science and Art Educational Institution worthy of the largest and most important town in the south-eastern counties, will be so far seconded by the help of the municipality and the pecuniary support of the public as to meet with full success at an early date."

Maidstone School of Art.—An exhibition of drawings and paintings executed during the past year by students of this school has been held, the works being arranged in the corridor leading to the concert-hall of the Corn Exchange. On the whole, both drawings and paintings seem to have been carefully and conscientiously executed, and several displayed signs of talent. The lady students bear off a fair share of the honours of the year, and they were particularly successful in carrying away the local prizes. The distribution of prizes took place at the Concert-hall. Mr. W. Hart Dyke, M.P., presided. The report says, "The committee, in presenting their fourth report, would call to mind that it is fast approaching five years since these art-classes were first commenced in Maidstone; and while they have to regret that the middle and upper classes do not continue to support the effort as they might, by sending their sons and daughters for instruction, they rejoice to say the artizans have shown their appreciation of the great advantages offered by well maintaining their numbers."

The Southampton School of Art and its Head Master.—There has for some time been an unfortunate misunderstanding between the council of the Hartley Institution and the head-master of the art-school, Mr. Baker, which has eventuated in a public meeting, at which Mr. Baker explained the causes of difference, and resolutions were unanimously passed, urging an inquiry into the present position of the Hartley Institution, and how far, as at present conducted, it meets the requirements of the town in respect to its foundation; thanking members of its council for their efforts; and pledging the meeting to use every exertion to establish a new school of art under Mr. Baker, in connexion with South Kensington.

LONDON SCHOOL BOARD.

IN the architects' department the following appointments have been determined on:—One chief draughtsman at 200*l.* per annum, two senior draughtsmen at 140*l.*, one senior draughtsman at 120*l.*, four junior draughtsmen at 80*l.*, and one writing clerk at 80*l.* per annum. The annual cost of this staff would be less than that previously recommended, by 26*l.* The committee obtained the necessary power to carry out their recommendation.

The following architects have been invited to submit designs in competition for the proposed building for the London School Board on the Thames Embankment:—Mr. Blomfield, Sir Digby Wyatt, Mr. G. F. Bodley, and Mr. J. O. Scott.

LEAD ON CATHEDRAL ROOFS.

WITH reference to the danger attending the use of solder for mending cathedral roofs, the clerk of works at Lincoln Cathedral says:—

"The method of laying on lead is to have the sheets of a reasonable size, which should never exceed 12 ft. long, and the narrower they can be conveniently put in, the better the work, and the less liable to be affected by sudden changes in the temperature. In the lining of gutters proper drips should be provided, not greater than 12 ft. apart: 8 ft. would be better. The mode of covering roofs is to use what is technically termed *tabs*; that is, square pieces of lead of about 6 in. These are nailed on to the boarding of the roof at the meeting of two sheets, having their edges turned up about 4 in. each. These edges are turned with the tabs into a roll, forming a complete protection to the roof below from the rain. The tabs used for steep roofs are more numerous than for flat ones, for the reason that the lead has a greater tendency to slide down.

In some recasting that was done early in this year I took an account of the cost of the labour, and found that, with coals added, the cost was less than three-fourths of a penny per foot super. I am, therefore, satisfied that it is less expensive to have the lead taken off and recast whenever it becomes bad than to endeavour to mend it with solder, for with solder there is a perpetual expense and a leaky roof."

WORCESTER CATHEDRAL.

IT has been customary, for some years past, on the occasion of each returning Festival, to detail, for the information of readers, the architectural condition of the cathedral, and the progress of the work of restoration which has been so long in hand. Although we are not in a position to record the completion of the works, it is satisfactory now to be able to state that the year 1873 will probably witness the re-opening of the entire cathedral in its completely restored condition. Meanwhile we collate a few notes of what has been done in and upon the building since the last assembly of the three choirs in Worcester.

In the December following the Festival of 1869 the new peal of bells arrived, and were hoisted into position in the renovated tower. They were from the foundry of Messrs. Taylor & Co., of Loughborough, and their total weight is 221 cwt. 3 qrs. 22 lb., besides the great clock-bell, which weighs 4½ tons. There are twelve bells which ring in peal, and a small extra bell for the quarter chimes. A new clock, from the designs of Mr. Denison, Q.C., manufactured by Mr. Joyce, of Whitchurch, has since been added; and to complete the arrangement in the tower, Mr. Ald. Lea presented a set of chimes. They have been manufactured by Messrs. Gillott & Bland, of Croydon, will play twenty-eight tunes, and will cost between 400*l.* and 500*l.* The chimes will be completed in two or three months. The cost of the clock and bells was nearly 6,000*l.*

Three years ago it was found that the execution of the contracts for the work already done had exhausted the available funds, and that after an expenditure of 50,000*l.* another sum of 15,000*l.* would be required to place the cathedral in a complete state of restoration. At this point Earl Dudley stepped in, and early in the year 1870 made the offer to complete at his own expense the entire restoration of the cathedral, provided that structure was never again used for the purpose of a musical festival. Earl Dudley's proposal was declined, after which his lordship made another offer, wherein he proposed to give 5,000*l.* towards the restoration, on condition that the remaining 10,000*l.* should be raised by the city and county during the next three years. Within less than three weeks nearly 11,000*l.* were raised, besides Earl Dudley's donation. The amount was contributed by only 130 subscribers. Among the first works done in consequence of this successful movement was the relaying of the floors of the Lady Chapel and aisles with a new pavement of stone and marble, in large quatrefoil patterns. The next thing undertaken was the decoration of the choir-roof, which had been previously scraped till it presented the bare masonry only. Messrs. Hardman, of Birmingham, undertook this work. Messrs. Farmer & Brindley, of London, undertook the execution of the new stalls, screens, wood-carving, &c., of the choir. This work is not yet completed. This information we have condensed from the *Worcester Herald*.

The Lord Bishop of the diocese has presented an episcopal throne, at a cost of 300*l.*, but this has not yet been erected, nor have all the choir-screens and grilles been raised. A pavement of Devonshire marbles, Greek green, and encaustic tiles, is now being laid down in the choir, by Messrs. Poole & Co., of London, at a cost of 1,100*l.* Mr. Skidmore, of Coventry, is supplying the metal-work.

At the close of the present festival, the work of repairing the nave and north porch will be commenced, and handsome gates will be erected in the porch. Gas will be introduced to the cathedral for evening service; it is to be laid on in string courses on the walls and piers of the nave, and lofty standards in the choir. A new organ, by Hill, of London, will be ready for the re-opening of the choir and nave. It is stated that Government has made a grant for the restoration of King John's tomb, and Prince Arthur's mortuary chapel.

Among the exterior improvements of the precincts, the visitor will be pleased to note the clearing of the college yard of building materials, sheds, and rubbish; the levelling of the ground, and the appearance of a nicely-kept turf, which is by far the most appropriate setting for architecture. At the west end the old house, formerly occupied by Canon Benson, has been destroyed, and a better view opened for that end of the cathedral; but a portion of the remains, of Early Norman date, has been allowed to stand as a relic. A new pathway of stone has been laid down from the western entrance, communicating right and left with the college precincts.

SEWER GAS AND LEAD PIPES.

SIR,—It seems to me that soil-pipes should be made of pure lead, and not of the compound which is used in many lead-mills, and which contains a mixture of different kinds of old metal, such as old spoons, portions of what is called Britannia metal, zinc, &c., collected by marine-store dealers and many others who buy and trade in old metals. Many tons of this compound are melted and cast into pigs and other shapes, and sold to the lead-mills, where it is manufactured into pipes, sheets, &c. I do not doubt the efficiency of these sheets and pipes for ordinary water-pipes, gas-pipes, flashing, &c., where there is no chemical action; but I think the particles of zinc, &c., will be strongly acted upon by the gases arising. I have detected this in pipes made from this mixture of metals used in our paper works in this locality, which our plumbers have called being honeycombed; whereas the pipes made from pure, or what we call virgin lead, have not been so. I do not wish it to be understood that the mixture of metals named is used at all lead-mills, as many use lead direct from the mines or the smelters, and any of the lead-mills will supply sheets or pipes made from pure lead, if specially ordered, and which is certainly preferable to the compound before named. I should be glad to hear some suggestions with respect to a substitute for leaden soil-pipes. I am convinced by experience that iron soil-pipes are corrosive and offensive.

A PLUMBER.

REMOVAL OF CITY CHURCHES.

THE old City churches are one after another disappearing under the influence of street improvements and other kindred causes. It is now stated that the Merchant Taylors' Company are about to deal with St. Martin's Church, Outwich, by removing the church, selling the site, and applying the proceeds of the sale, together with the tithes, to the endowment of churches where they are wanted; and that the Dean and Chapter of St. Paul's are dealing in a similar manner with St. Peter-le-Poer, the arrangement being that on the next avoidance of the rectory the income is to be paid towards the augmentation of the benefices of several churches in St. Pancras, and 125*l.* per annum to St. Mary, Charterhouse. All-hallows, Staining, is also to be removed.

OPENING OF THE NEW SOUTH YORKSHIRE LUNATIC ASYLUM.

THE spacious asylum erected in Wadsley Park, near Sheffield, for the accommodation of the pauper lunatics of the West Riding, has been formally opened. The building is situate on the western slope of the Don Valley, half-way between Wadsley and Oughtibridge, and is one of the largest structures near Sheffield. It rises in three great blocks—a central edifice, with wings at right angles, which communicate with each other by corridors. The estate comprises about 163 acres, purchased at a cost of 23,000*l.*, so that there will be ample ground for recreative purposes, as well as to afford the inmates healthful employment. The building altogether will cost fully 100,000*l.* Mr. B. Hartley, of Pontefract, the West Riding Surveyor, was the architect; and Messrs. Robert Neill & Sons, Manchester, were the contractors. The engineering work has been executed by Messrs. G. Haden & Sons, Trowbridge. Mr. Ryall has acted as general manager; and Mr. D. Kershaw as clerk of the works.

At a meeting of magistrates and others at luncheon after the opening, Mr. Stanhope, M.P., in proposing the health of the architect, referred to several improvements made in the internal arrangements of the building, the principal of which was that they had none of the old-fashioned gloomy passages, with rooms which it

was impossible to light, opening from them on each side. Every room in the asylum had a window on one side and a fire-place on the other, and he believed that in the end was the most simple and cheap style of building that could be adopted, although the effect on the outside might be rather grand. Altogether, it was as cheap a building as could well be put together. They had been fortunate in getting hold of a satisfactory contractor in the person of Mr. Neill, of Manchester, a gentleman who occupied a high position in that city, and who had carried through the work most conscientiously. He deserved all praise. Mr. Neill, by the appliance of machinery, had been able to utilise the clay which was got in excavating the foundations of the asylum. The whole of the bricks of which the building was composed had been made out of the excavations, and there were a great many left over, sufficient to go on with another ward, which he feared would very shortly have to be put in hand. He proposed the health of Mr. Hartley, the architect, whose labours had been extremely great; and of Mr. Kershaw, the clerk of works, who had also efficiently performed his duty.

SOMERSET ARCHÆOLOGICAL SOCIETY.

THE twenty-fourth annual meeting of this society has been held in the great hall of Taunton Castle. There was a good attendance of members and others interested in archæology. The large room contained a considerable number of ancient and valuable manuscripts, historical relics, and other interesting objects, lent for the occasion by members and friends of the society. Mr. E. A. Freeman, D.C.L., took the chair.

The Provost of Eton proposed, and Mr. R. K. M. King, seconded, the election of Mr. W. A. Sanford, F.G.S., as president, and the motion was carried *nem. con.* Mr. Sanford then took the chair.

Mr. W. A. Jones, M. A., read the report of the council, which stated that the indexes to the three principal record-books at Wells Cathedral would be copied, together with the contemporaneous marginal notes, and published in the proceedings of the society. The council had appointed a committee to co-operate with the promoters of a legislative measure for the protection and preservation of historical monuments.

The report having been adopted, the chairman delivered an interesting address, in the course of which he remarked that three great works of repair of their ancient monuments were approaching completion. First, the west front of their cathedral was sufficiently advanced to enable them to judge somewhat of the effect. He said, that in some respects this was at present disappointing. In the next place, the fair form of the spire of St. Mary Redcliff pointed heavenward over the bustle and commercial activity of the great city of which its parish forms a virtual portion. It was a noble finish, and a noble work of repair honestly and patiently carried on through many years. The stone ceiling of the nave of the great church of St. Peter, at Bath, was worthy of the golden age of English vaulting. After remarking that St. James's, Taunton, would now rise in simple and graceful imitation of St. Mary's, the chairman went into a long and interesting argument respecting geology and natural history, which was listened to with great attention.

Mr. G. T. Clark followed with a paper on "Taunton Castle," in which he pointed out that the structure stands upon one of the many low hummocks of gravel, often with a face of red marle, which rise out of the extensive fen lands of that singular district, and which, before agriculture drained the marshes, was more inaccessible than even the hill fortresses of the upper country. Upon the right bank of the Tone,—the river whence the town derives its name,—the celebrated leader and lawgiver of the West Saxons was reported to have established himself in 702, while engaged in securing his frontier against the Western Britons, who still maintained a footing in the border-ground east of the Tamar, and among the Brendon and Quantock Hills, holding probably the camps which still remained but little altered by the lapse of 1,000 or 1,100 years. That seemed to have been the origin of the town of Taunton. In the sequel of his paper Mr. Clark gave some interesting particulars relative to the castle of Taunton.

Subsequently the castle, the Church of St. Mary Magdalene, the priory, and the Grammar-school were visited, and in the evening there was a luncheon at the London Hotel.

The evening meeting, on Tuesday, in the Castle Hall, was presided over by Mr. Sanford, and the body of the chief hall was quite thronged. Mr. W. Boyd Dawkins, M.A., F.R.S., gave an address, illustrated by charts, on the "Ancient Geography of the West of England." Mr. Freeman (the ex-president of the society) read a treatise upon the history and work of Ine, king of the West Saxons. Ine raised Taunton as a bulwark against the Britons, and gave the western part of his dominions the first bishop of their own, and placed the holy Ealdhelm in the church of Sherborne, which he founded. He was the second founder of British Glastonbury, and the first founder of English Wells.

On Wednesday the first excursion was taken. Hestercombe and the quarries of syenitic granite were visited. Mr. W. A. Jones, who is one of the hon secs. of the Society, pointed out the junction of the syenitic granite with the Devonian strata. Mr. R. K. M. King read an account of the rock, written of in Corner's Geological Survey. Mr. J. H. Parker, C.B., pointed out fragments of the old hall of Hestercombe, constructed in the time of Henry VII. The minstrels' gallery and pictures attracted much attention. A paper upon the history of the family having been read by the Rev. T. Hugo, a move was next made for Kingston Church, which Mr. Parker described. Luncheon, in the adjacent schoolroom, provided by Mr. W. E. Surtees, having been partaken of, Norton Fitzwarren Church, and the camp lying above, were then inspected.

On Wednesday evening, Mr. W. A. Jones read a paper on "The Customs of the Manor of Taunton Deane;" the Rev. W. Tuckwell, head master of the College School, one "On the Flora of the Quantocks;" the Rev. J. Coleman, one "On the Old Register of the Parish of Stoke St. Gregory;" and the Rev. T. Hugo, one "On St. Margaret's Hospital, Taunton," built about the year 1270.

In reply to Mr. Patton's request that the next meeting might be at Sherborne, Mr. Jones promised the council's consideration of the point, but gave reasons why Wells should be selected.

STABLES IN WESTMINSTER.

EXTENSIVE stabling has been erected, with a frontage towards Buckingham-row, Westminster, for Lord Auckland, consisting of stalls, loose boxes, double and single coach-houses, and living-rooms for servants above. The elevation towards Buckingham-row, in the Domestic Gothic style of architecture, is built of white Gault brick, with moulded strings, and relieving arches of yellow malms, having an entrance-archway, which is protected from the road by light wrought-iron gates. A small gablet rises above the entrance-arch, containing a floriated circle, in which are carved in bas-relief the crest and monogram of the owner. The gablet is finished with a top stone, surmounted by a light finial of ironwork. In the interior, pine, stained and varnished, is used for all skirtings, and the roofs are covered with Vieille Montagne zinc. The site of the present building formed the subject of a law-suit between Lord Auckland and the Westminster District Board of Works. That body, thinking it its duty to deprive him of at least 20 ft. of his land, and refusing him compensation, lost the day, both in the first case, before Vice-Chancellor Malins, and on the appeal, before the Lords Justices.

The contract was taken by Mr. Henry Wagner, builder, for 1,120*l.*, and he has carried out the works. Mr. William Scott Champion is the architect.

THE INSCRIPTION ON THE TOMB OF THE BLACK PRINCE, CANTERBURY.

THIS inscription is ascribed by Dean Stanley and others to the Black Prince himself. Sir F. Madden writes to the *Times*:—

"What authority the Dean of Westminster may have for the above assertion I am ignorant, but I beg to point out (what has hitherto escaped notice) that the epitaph in question is borrowed, with a few variations, from the anonymous French translation of the *Clericalis Disciplina* of Petrus Alphonsus, composed between the years 1106 and 1110. In the original Latin work it may be found at page 196, part I., of the edition printed in 1824 for the Société des Bibliophiles Français. The French version is of the thirteenth century, and entitled *Castoiement d'un Père à son Fils*. It was first printed by Barbasan in 1760, and, more completely, by Méon in 1808, in whose edition the epitaph may be read, page 196, under the heading of '*D'un Philosophe qui passoit parmi un Cimetière.*' The Black Prince, however, is not the only distinguished personage who has availed himself of this inscription, for more than half a century previously it was placed (in an abbreviated form) on the monument of the famous John de Warenne, seventh Earl of Surrey, who died in 1304, and was buried before the high altar in the Priory of Lewes. It is printed by Dugdale (not very correctly) in his *Baronage*, vol. i., p. 80, from the Lewes Cartulary, which is preserved among the Cottonian MSS. in the British Museum, Vespas. F. XIV."

SUNDERLAND SCHOOLS, AND COMPETITION.

THE Clerk said they had, in answer to their advertisement, received thirty-four architects' plans, competing for the prizes of 20*l.*, 10*l.*, and 5*l.* offered by the Board for the best designs for schools to be erected on a site in James Williams-street. The plans have been catalogued, and were now on view at the Grange School, where they would remain during the week.

The Chairman said he had examined all the plans very carefully, and he thought they had obtained a very fine collection. In awarding the premiums, they must, of course, consider what was best for their own locality and requirements, and, as far as he had seen, he thought there were eight or ten plans which would be found very suitable. *He suggested that the Board should be divided into two committees of six each, one committee to decide on the best block plan, and the other on the best elevation.*

The chairman's suggestion was agreed to.

SIR,—Under the impression that the above extract may be of some service to you, as showing the manner matters are being conducted here by the local School Board, I would draw your attention to the parts in italic in the report of the meeting, with a view to the noticing of the absurdity of selecting separate elevations and block plans.

The plans have been thrown open to the public for inspection, and after careful review any person competent at plans may arrive at the conclusion as to the class of competitors who have contributed their efforts. In my humble opinion, it will be difficult to obtain three designs which meet the requirements of an elementary school, or that of the Commissioners of Education, so that the Board are likely to fall lamentably short of what they expected for their money. I have examined the plans, and find that the more showy or well got up are the elevations, the less are the plans belonging to them adapted to schools of the class required.

NON-COMPETITOR.

THE METROPOLITAN BUILDING TRADES MOVEMENT.

ON Saturday in last week the delegations from the London carpenters and joiners, who have had the carrying out of the recent movement and strike for the "nine hours and the ninepence," was virtually dissolved, and the central committee all retired from office, the treasurer, secretary, and the two auditors alone remaining for the purpose of bringing out the audited balance-sheet of the movement. One of the last acts of the central committee, however, was, unhappily, to declare that they looked upon the recent compromise between the masters' committee and their deputation, not as a final settlement of the claims put forth in their memorial, but more in the nature of an armistice, leaving the trade free to renew its efforts in favour of the full terms of the memorial on the first favourable opportunity. The secretary was instructed to call together a new delegation from all societies, shops, and jobs, to assemble on Thursday evening in this week, having for its object the adoption of measures to enforce compliance with the terms of the new agreement in those firms—about forty in number—who continue working on the old system of 56½ hours, at 8d. per hour; the extension of the union organisation throughout London; and the laying down a plan of action for renewing the movement to obtain the 51 hours at 9d. per hour in the spring of next year, should the state of business justify such action being taken.

A serious complication has arisen between the Master Builders' Association and the Masons' Society. It appears that in the agreement made between the committee of masters' and the masons' deputation, they were to leave off work at 12 o'clock on Saturdays all the year round, but the agreement entered into with the other trades specifies 1 o'clock as the leaving-off hour on Saturday during the winter months. The masons' deputation made no distinct arrangement with the masters' committee as to payment for overtime, it having been a recognised custom in the trade that all overtime worked by masons beyond the regular working hours each day was paid for at the rate of time and a half for every hour up to 10 p.m., and double time up to 6 a.m. The agreements made with the carpenters and the other trades include arrangements for overtime, and its payment at the rate

of 1d. extra for the first hour after 5 p.m., at the rate of 2d. per hour extra for the next two hours, and time and a half afterwards. Thus the payment for overtime to be made to the other trades is considerably less than the amount now secured by the masons. The masters have called upon the masons to accept these terms as regards the hour for leaving off on Saturday and overtime payment, and to modify their agreement accordingly. This the masons' committee have refused to do, and have further informed the masters that any attempt on their part to tamper with the terms of the agreement, or to infringe upon the recognised payment for overtime received by the masons, would be resisted by the whole power of their society. A general meeting of the masons, held on Friday in last week, endorsed the action and letter of their committee.

As to the cost to the masons of the lock-out and strike, it appears from their balance-sheet that the three weeks' lock-out and strike cost the masons close upon 830*l*. A sum of 521*l*. 2s., being 2s. a day from 1 to 17 days, was disbursed for "dispute pay" amongst 428 members of the Operative Stonemasons' Society of England and Wales, most, if not all, of whom were also included in the 439 members who shared in three dividends, amounting in the aggregate to 151*l*. 5s. 6d. obtained from levies and subscriptions; and 191 non-members received 52*l*. 1s. 6d. from the same source. After the settlement with the employers on July 5th, 12 members and 9 non-members were "withdrawn" from work to enforce the new terms, the former receiving 6*l*. and the latter 8*l*. 13s. 4d. from levies, or 2s. 8d. a day, the time ranging from 1 to 18 days. The charge for collection and distribution was 89*l*. 19s. 7½d.—viz., executive, 43*l*. 4s.; deputation, 16*l*. 5s. 11d.; printing and stationery, 16*l*. 15s. 9d.; postage and telegrams, 3*l*. 1s. 6d.; hire of rooms, 2*l*. 7s.; newspapers, 13s. 11d.; and auditors, 7*l*. 11s. 6d. The receipts comprised 537*l*. 5s. 3d. from the C. C. (central committee) of the society; 112*l*. 19s. from levies of 3s. per week upon men working in the London district; 34*l*. 4s. from a sixpenny levy; and 162*l*. 17s. 7½d. from general subscriptions; making a total of 847*l*. 5s. 10½d. The number of men locked out and on strike embraced in the account was a little over 550. There are from 18,000 to 20,000 members enrolled in the society throughout England and Wales, and the masons are probably the most highly organised of all the branches of the building trade in London.

The turnout of the masons, bricklayers, plasterers, carpenters, joiners, painters, and labourers in the employ of Messrs. Corbett & M'Clymont, has suspended some of the building operations in the neighbourhood of West Brompton and Earl's-court, where for some time past residences of a superior class have been springing up in all directions. It was upon a part of this work the four hundred and seventy men and boys now on strike were engaged up to Saturday last. The firm had conceded the new terms as to hours and wages all round; but it withdrew the concession at the expiration of a week. There are seventy-eight carpenters and joiners amongst the turnouts. The Operative Painters and House Decorators' Society have already taken action on behalf of the sixty-five of their trade who have "come out," and similar appeals are being made to their respective trade societies by the bricklayers, plasterers, and labourers who make up the rest of the workmen on strike at West Brompton. The members of the late (?) Central Committee of the Carpenters met on Tuesday at the Brown Bear to discuss this "Brompton" strike. Mr. Shipton advised that a deputation composed of representatives of each trade should seek an interview with the firm, to endeavour to persuade it to stand by the arrangement come to a week ago. With the exception of the plumbers, who were receiving 9½d. an hour, every one had turned out, and, upon second thoughts, seeing the unanimity that prevailed, the firm might be disposed to abide by the terms of the Masters' Association. While on the spot he was informed that a numerous meeting of master builders was being held at the Redcliffe Estate Office, where the firm transacted most of its official business, being the builders upon that extensive estate.

The members of the Builders' Labourers' Union have met in Pentonville-road, when Mr. Kenny, their secretary, argued that even 6d. an hour, which the labourers demanded, was not sufficient remuneration for them. He said he wished to see the employers have a fair return for their capital, but he did not want them to retire from business after ten years, and take country mansions; while the poor labourer, after twenty-five years' hard work, had nothing left for him but the workhouse. Mr. Halloran stated that 250 men were being added to the union weekly. A resolution was adopted establishing an additional lodge, the members of which are to meet at Pentonville every Monday. The union now consists of fifteen lodges.

A correspondent writes to us that the statement that the "dividend" in the eleventh week of the strike was 13s. to lock-out men is an error, and that it should have been 10s. for that week; nor had it been more than 12s. on any week before the "settlement," that sum being paid only once (except to men from Brass's and Jackson & Shaw's).

SANITARY STATE OF BECKENHAM, KENT.

SIR,—Having lately paid a visit to Beckenham, I was entirely disgusted with the state of some of the old conveniences there. It appears that in the vicinity of Brackley-road there are existing at the present time some which have not been cleaned out for years, although Beckenham is, or is supposed to be, properly drained. Yet such a state of affairs is allowed. Why is this? Is there no sanitary inspector? or, if there is, why does he not perform his duty?

ONE WHO HAS EXPERIENCED THE NUISANCE.

SEWER GASES.

SIR,—It having become necessary for drainage purposes to empty a cesspool which probably had not been emptied for several years, this work was done at night, and the next morning when one of the men was engaged throwing lime into the pit to disinfect it, an offensive smell arose from it, and the man suddenly became pale, staggered, found great difficulty in breathing, and was some time before he recovered. The cesspool in question was about 7 ft. deep, and when a lighted candle was put down the pit it kept alight for a depth of 4 ft. or 5 ft., but when it was lowered to within a foot or two from the bottom it was immediately extinguished.

Will any of your readers kindly inform me what gases, if any, could cause these symptoms in the man and extinguish the candle?

L. L.

EVERSHAM SEWERAGE.

SIR,—I wish to correct a statement reported in your issue of the 14th inst., namely, that my proposal involved an outlay of 40,000*l*., while another estimate was only 4,000*l*.

I beg to say my estimate for sewerage and waterworks complete was 11,980*l*., and that the one of 4,000*l*. was for sewerage works, and did not include waterworks.

The population of Eversham being about 5,000, I think from your knowledge of such matters that you will agree in thinking that my estimate does not involve an excessive outlay for these works (sewerage and waterworks), and that the 4,000*l*. would be inadequate for the required purpose.

JOSIAH FORSTER FAIRBANK, C.E.

THE ANT NUISANCE.

IT would be a boon if any of your readers could prescribe an effective agent for the destruction of that troublesome little insect, the house ant; and tell us whether any, and if so what, special conditions favour its existence and reproduction. I have exhausted every nostrum known to me to be a destroyer of ants, and tried various original preparations, but all to no purpose.

At the present time I have a large, well-built house, the basement of which is literally alive with them, though every crevice has been carefully stopped, and the ceilings, walls, and floors, thoroughly saturated with various kinds of supposed specifics. Possibly a better knowledge of the habits and natural history of these ants might aid the discovery of a real antidote to their existence in our houses, though, doubtless, the only *radical* exterminator is the discovery and destruction of their nest or nests.

After many patient trials, I must frankly confess that to attempt to free a house from them by simply destroying those which infest the floor and walls, &c., seems to me much like trying to exhaust a well with an inexhaustible spring of water.

It is certainly important to ascertain whether these insects make their way into the building from the earth upwards, or whether they are introduced with the building materials, or how they do get into solid structures.

B.

SCHOOL-BUILDING NEWS.

Bristol.—The foundation-stone of new schools for St. Silas parish has been laid. The schools are intended to accommodate 700 children,—200 boys, 200 girls, and 300 infants; and the site is a piece of ground adjoining the church. The school buildings will form three sides of a square,—the girls' room being on the left, the boys' on the right, and the class-rooms and the infant-school at the back. The quadrangle, which will form a playground for the infants, will be separated from the roadway by the boundary-wall of the premises. The boys' and girls' playgrounds will be behind their schools. The rooms for the girls and boys will be 68 ft. by 20 ft., and there will be a class-room of 16 ft. by 20 ft. for each department. The infant school-room will be 75 ft. by 33 ft. The necessary accommodation in the way of cloak and hat rooms, lavatories, closets, &c., required by the Education Department, has been provided for. The building will be in the Early English style of architecture, and the material Pennant stone, with freestone dressings. The roofs will be open-timbered, and covered with Bridgwater tiles, in patterns. Over the entrance to the infant-school will be a bell-tower. The contract has been signed for 1,800*l*., but the school-fittings and some extras for foundations will bring up the cost to 2,200*l*., of which 500*l*. have yet to be raised. It is hoped that the buildings will be completed early in the spring. The architect is Mr. Joseph Neale, and the general contractor Mr. R. J. Crocker, of Bedminster. The mason's work will be carried out by Mr. J. P. Stephens, who is engaged rebuilding St. Silas's Church.

Liverpool.—The plans of Messrs. Reade & Goodison, of Canning-chambers, South John-street, architects, for the public elementary schools in connexion with the School Board, in Chatsworth-street, have been adopted by the Sites and Building Committee of the School Board. The architects who have been successful for the Queen's-road site are Mr. Thomas Cook, of South Castle-street, and Mr. John E. Reeve, of Lord-street.

Catworth, Hunts.—Plans for these schools and master's house have been passed by the Privy Council, and the works are to be commenced at once. Mr. William Streather, of Raunds, is the builder; and Mr. John Ladds, of London, the architect.

Books Received.

Ancient Examples of Domestic Architecture in the Isle of Thanet. By J. P. SEDDON. 1872. John B. Day.

EVERY one who has walked in the Isle of Thanet with his eyes in his mind has noticed the specimens remaining of a peculiar mode of cottage construction, in brick and flint work, dating from the seventeenth century, the principal feature of which is a gable, mostly made up of portions of a circle, and usually coped with brick. Mr. Seddon has usefully brought together ten examples from Broadstairs and Reading Street. They are somewhat roughly set forth, but answer the purpose.

VARIORUM.

"THE Dictionary of Practical Receipts. By G. W. Francis, F.L.S. New and improved edition by D. Francis. London: Allen, Ave Maria-lane." This volume contains upwards of five thousand receipts in trade and manufacture, domestic economy, artistical, ornamental, and scientific processes, pharmaceutical and chemical experiments, &c. It is not only alphabetically arranged, being a dictionary, but contains a copious index for still more ready reference and connexion of subjects. It is by no means likely that it is faultless: no such book ever can be so; but we find it correct so far as we have tested it, although in some cases wanting in freshness of information. It might have had something about magenta, for example, in receipts for dyeing processes; but no such heading as magenta exists in it. And, by the way, we may here suggest, for a new edition, a simple receipt, which no freshness of information could have hitherto supplied, as it has only been used in one case, so far as we know. White muslin curtains can readily be tinted of a beautiful rose colour by magenta, dissolved in water. A shilling's worth of magenta powder, dissolved in barely as much water as to steep the curtains in completely, and then wrung out, tinted two pairs of large window-curtains after being starched, and another pair after these were done. The tint fades soon where much exposed to the sun, but it can readily be renewed, where faded, by a soft brush, or by dipping anew. Our lady friends will thank us for this novelty in "domestic economy." There are various applications of it,—for example, to toilet-covers, &c.——"The Royal Guide to the London Charities for 1872-73. By Herbert Fry. London: Hardwicke." This is the tenth annual edition of an astonishing evidence of charitable feeling on the part of the Londoner, and painstaking on the part of Mr. Fry. It contains upwards of 200 pages of mere arranged titles of London charities, besides nearly 100 more of charitable advertisements!

Miscellanea.

Canterbury and the New Public Health Act.—A meeting of the Canterbury Town Council was called for the purpose of taking into consideration the provisions of the Public Health Act. The town clerk said he was in doubt as to whether it was not necessary to hold a meeting of the Sanitary Authority within twenty-eight days of the Act, and that was the reason of his calling the meeting. He did not anticipate that there would be anything to do, as it would be better to defer the appointment of a medical officer till the regulations of the Local Government Board came before them. He read the 6th clause of the Act, which provides that the Local Board shall transfer all their powers to the body to be called the Urban Sanitary Authority, which in the case of boroughs (said the clerk) would be the Town Council. The clause also provided for the appointment of a medical officer of health and an inspector of nuisances, and the Local Government inspectors would have the power of being present at the meetings of the Board and exercising the same power as the Poor-law inspectors at boards of guardians. The meeting was ultimately adjourned till the 9th of October next.

Leicestershire and Northamptonshire Archæological Societies.—The annual meetings of the members of these societies commenced on Tuesday in last week, at Lutterworth, with divine service in the parish church. Subsequently, the Rev. G. A. Poole (Welford) explained the principal features of this edifice. The company then returned to the museum, which had been fitted up by the local committee in the large room of the town-hall. Some illuminated manuscripts were shown of the thirteenth and fifteenth centuries. The Rev. A. Pownall read a paper on Mediæval glass vials found at Lutterworth and South Kilworth. The excursion took place on Wednesday, when about fifty ladies and gentlemen started at nine o'clock from Lutterworth. The following places were visited:—Newnham Paddox, the portraits by Vandyke and some interesting relics being shown; Monks Kirby Church, Brinklow (church and tumulus), Coombe Abbey, site of a religious house of the Cistercian order, cloisters, rebuilt by Lord Harrington, temp. James I.; many pictures of the Stuart family and period; Withybrooke Church, and Claybrooke Church. This brought to a conclusion a very successful meeting.

The Statistical Congress in Russia.—The foreign members of this Congress have been hospitably entertained in Moscow as well as in St. Petersburg. The municipality provided them with accommodation in the best hotels, and with horses and carriages. They visited the Exhibition, and the monuments, of the city, and were entertained by Prince Dolgorouki, Governor-General of Moscow, at a concert, ball, and supper. On the 4th instant they visited Warsaw, where a banquet was prepared for them by Field-Marshal Count de Berg, Lieutenant of the Emperor in Poland; and on the next day a review was held in their honour.

A Large Chimney.—The large chimney-shaft which has been in course of erection for some months at the alkali works of the Connah's Quay Chemical Company, was finished last week. As it is the largest square chimney in England, its principal dimensions will doubtless be interesting to our readers. The foundation, which is 28 ft. square, and 13 ft. 6 in. deep, is composed of 620 tons of stone and rubble. The chimney is 17 ft. 6 in. square at the base (inside measurement), and 7 ft. square at the top (inside measurement), and is 245 ft. high from the surface. The cap for the top, weighing 25 tons, is composed of fireclay and stone. The number of bricks used in building the chimney is 1,078,000, and the total cost a little over 2,000*l*. The chimney will be provided with two lightning-conductors.—*Chester Chronicle.*

The Dublin Exhibition.—The executive of the Dublin Exhibition have been fortunate enough to secure for exhibition Lord Londesborough's valuable collection of arms and armour. It was formed many years since by the late Lord Londesborough, and consists principally of European arms and armour, and a choice selection of Oriental, derived from well-known sources; and it may be considered (now the Meyrick Armoury is dispersed) one of the finest private collections in Europe.

Gibbs's Hay-drying Machine.—A letter from Mr. Amersfoordt, of Lake Haarlem, to Mr. W. A. Gibbs, Gilwell Park, Sewardstone, says,—"Your hay-drying machine proved the great attraction of the day. It had been announced by the Agricultural Society that grass could be made into hay by this machine in ten minutes. We had spared for this purpose a beautiful crop of Timothy-grass and clover, in the immediate neighbourhood of the hay-dryer. It was cut by a workman with a scythe before the eyes of the assembled crowd. On the day before we had been able to dry it satisfactorily in exactly six minutes; the people now of course hindered the men a little in their work, but it was done in ten minutes, and I saw with satisfaction a great many farmers taking samples of the beautiful green but perfectly dry hay, to show it at home to their friends. After this feat was accomplished, we showed to the public the real work for which the hay-dryer is intended, taking hay that was half dry and drying it in three minutes ready for the stack, as will be necessary on wet days, when is the real use of the hay-dryer, as it was used frequently on my farm in the autumn of 1871."

Australian Meat.—We have reason to think that a dislike to Australian meat has arisen from the fact that there are purveyors who force upon the market meats which really deserve all the ill that is said of them. These meats, however, are of very different kinds from those got from the more respectable purveyors. A writer in the *Food Journal* says of Australian meats:—

"Against the ignorant, flippant expressions which we hear now and then among us, such as 'I like to see the joint,' 'I like to know what I eat,' &c., we protest energetically; the question is a serious one, one which affects the well-being of millions, and deserves the serious attention of sentient beings. We like hothouse grapes, but we do not like to pay five shillings a pound for them; we like fresh green peas, but we like 'tinned peas' when we cannot get them green. We should like to see a leg of mutton or a sirloin of beef on every family table, all the year round; but, as that is scarcely to be hoped for at present, we should like to see a good dish of Australian meat there instead."

One of the great obstacles to the general adoption of Australian meat is that unless eaten cold, when it is excellent, it requires some little knowledge of cookery to manage it properly. It cannot be roasted, or baked, or boiled like a fresh joint. Those who wish to get variety, to make the most of Australian meat, must take the trouble to learn how to cook it. To use good Australian meat is one of the best ways to obtain good English meat at moderate prices.

A Boston Idea.—A discovery is said to have been made and applied in Boston which, it is claimed, will reduce the cost of steam-power more than 60 per cent. It consists of a novel process by which the great amount of heat which escapes into the air in the waste or exhaust steam from engines is utilised by conducting it through the tubes of a boiler filled with the bisulphide of carbon, a fluid which boils at 110° Fahr., and at the temperature of exhaust steam gives a pressure of 65 lb. to the inch in the boiler. The vapour formed in this boiler [how does the bisulphide act upon it and all the other apparatus?] is used to drive an engine, instead of steam; and, after being used, is condensed by cooling, pumped into the boiler again, and used continuously, without loss. It is claimed that experiments prove that by this process the same fuel now required to produce 100 horse-power with the best engines in use will produce 250 horse-power. We wish the Bostonians could show how to utilise the waste noise of wheezy engines and rampant steam whistles. What a waste of active force there is in these!

Sanitary Report on Southwark.—The annual report of the medical officer of health for Southwark (Dr. H. Bateson) has been presented to the Vestry, and printed by their authority. The death-rate for the parish for the past year has been 25 in 1,000 persons living; and the parish, "which has been, far away beyond the remembrance of the present generation, a by-word and reproach, remains no longer so: it may no more take its rank as the lowest amongst the low and wretched parishes of London, in which disease and death hold high and continued carnival." It is notable that the Peabody Buildings have had a higher death-rate than was expected, namely, 23½ in 1,000 persons living, or 1 in 43. In other metropolitan model buildings a more favourable state of health prevails, the death-rate averaging only 17 per 1,000. Peabody's Buildings, the reporter remarks, were too soon occupied, and months afterwards he found many of the ground floors still very damp.

St. Louis, U.S.—The chief citizens of St. Louis, now the third city in point of population in the United States of America, have addressed to the inhabitants of this country an invitation to come and see the wealth, the fertility, and the resources of Missouri. The time suggested is during the twelfth annual Exhibition of the State Agricultural and Mechanical Association, which will begin on the 3rd of October, and will continue open for nine days. The invitation is contained in a letter to the People of Great Britain, signed by fifty-eight representative men of St. Louis. The signatures include an ex-Governor, and an ex-Lieutenant-Governor of the State of Missouri, bankers, merchants, newspaper proprietors and editors, and others. They urge their desire to establish a direct and profitable exchange of products between Missouri and the Mother Country. The city of St. Louis stands at the junction of the Mississippi and Missouri rivers, and enjoys advantages of position which ought to render it the centre and key to the commerce of the West. The St. Louis merchants ask, in short, for capital to develop their facilities for trade.

You shall not Save your Money.—So say the Driffield School Board to the ratepayers. Plans for a school having been submitted and examined at the last ordinary meeting of that Board, the clerk was instructed to communicate with Mr. Paul, the architect to the Board, on some suggested alterations in the plan, and to prepare the specifications so that the advertisements for tenders might be got out at once. Mr. Paul having recommended that the advertisement should appear in the *Builder* and other London papers, a discussion arose whether it would not be desirable to confine the advertisement to the local papers; and it was the opinion of the Board that the work for building the schools should be kept in the town as far as it was consistent with economy. It was ultimately agreed that the advertisement should be inserted only in the York, Leeds, Hull, and Driffield papers:—For fear, of course, some London builder who does not read a country paper should offer to build the school for a less sum than any of the country builders would ask;—clever, certainly!

A Substitute for Coal.—Great results are expected from some experiments which are being made by the Duke of Sutherland on the waste lands of Sutherlandshire. He is utilising surface peat by making it into composite fuel. The first attempt was made with a combination of sawdust and peat, which, being mixed by steam machinery and then dried in cakes, was found to be excellent fuel, sixty of the cakes being equal to 1 cwt. of best Sunderland coal, while the cost is 25 per cent. less. The coal composites are even a greater success, thirty of these being set down as of the strength and value of sixty of the sawdust peats. If the cakes can be dried by artificial means,—and there is no reason to doubt this,—there will, we are told, soon be abundance of peat fuel in Scotland, and the successful working of the invention will greatly facilitate the reclamation of the waste lands.

A Startling Occurrence.—An incident of a singular nature has taken place at Retford. In the Market-place, on the site of the old town-hall, there was standing a large iron pillar, which supported four gas-lamps. It has been completely wrenched from its hold, and flung down with such force that the surrounding buildings were shaken to their foundation. An iron slate at the base was broken, all the lamps were smashed to pieces, but the pillar, singularly enough, was not damaged, although falling with such a thundering shock. The real cause is at present unknown. Could it be from electric action between the earth and the air? The most probable supposition, perhaps, is that there was an escape of gas from some subterranean piping, and that it was accidentally fired by some one passing by, and exploded.

Pencils for Japan.—The steam-pencil factory of Messrs. Wolff & Son, of Great Queen-street, was visited last week by several members of the suite attached to the Japanese embassy now in England. They were attended by Mr. Brunton, engineer to the Government of Japan. Their visit lasted about three hours, and at its conclusion they not only expressed themselves to have been highly gratified with what they had seen, but also requested to be furnished with specimens of pencil-making in all the various stages of manufacture from the raw material, for deposit in the Imperial Museum.

The Monument at Dunrobin to the late Duchess of Sutherland.—Her Majesty has laid the memorial-stone of a monument to the memory of the late Duchess of Sutherland in the grounds of Dunrobin Castle. There was a large attendance of subscribers and the public. Her Majesty said:—

"It gives me the greatest pleasure to testify on this occasion my love and esteem for the beloved Duchess, my valued friend, with whose children I am now staying. I wish to express my warmest thanks for the hearty and loyal welcome I have met with at Sutherland."

The monument is in the form of an Eleanor cross, with a bronze bust of the late Duchess, and will be built of freestone from a quarry on the estate. It stands on a green terrace on the right of the principal avenue, and will be seen from the railway and the public road which passes by the Lichies.

Worcester City and County Fine Arts Exhibition.—The first public exhibition of pictures and works of art in connexion with the Worcester City and County Fine Arts Association, was held during the Festival week, the gallery being formally opened on Saturday by Sir E. Lechmere, in the absence of Earl Dudley, who is the president. The mayor (Mr. H. Willis) presided on Saturday, and called upon Sir E. Lechmere to manage the proceedings. The committee stated that arrangements would be made to have the exhibition open to the public in the evenings, the collection being on view for a fortnight. Among the paintings exhibited are several by the old masters, lent for the occasion by residents of the neighbourhood.

Galvanisation of Iron and Wooden Beams.—A discovery interesting to iron-builders, relative to the conservation of the iron beams used in hydraulic works, has recently, it is said, been made in France. It consists in the application of a chemical process, operated at once, without any particular tools, and at trifling cost. Supposing two beams have to be joined together, holes have to be bored, and next filled with some zinc-filling mixed with any fatty material, then the peg or screw is introduced in the ordinary way. A galvanisation is thus slowly produced, absolutely the same as when iron is dipped into molten zinc. This process can even be applied to timber. Experiments have been made, and are declared to be perfectly conclusive.

The Danger of Whitehall Stairs.—An inquest at the Guildhall, Westminster, has just been held, touching another death at Whitehall Stairs from accidental drowning. A juror pointed out that several fatal accidents had occurred at the place named, and he thought Whitehall Stairs very dangerous. He was of opinion that a railing ought to be placed down the side of the steps, to prevent persons falling therefrom into the river. The Metropolitan Board of Works ought to see that this place is protected. Several other jurymen recommended that the coroner should write to the Board on the subject.

South London Working Men's College. This institution, 91, Blackfriars-road, has re-opened for the winter session with new classes in drawing, mechanical construction, history, grammar, and French. A new elementary and an advanced French class have begun this week, under Mr. Oswald. A night-school, of an advanced character, for men only, meets three nights weekly; and the members of this are admitted to the history and grammar classes without further charge. The secretary is Mr. Rossiter.

New Light at Buffalo.—The entire town of Buffalo, U.S.A., is now lighted by hydrogen gas, it is said, extracted from hydrate of lime, carburetted, and burnt with the oxygen extracted from the atmosphere. The cost of the hydrogen is about 1d. per cubic mètre; that of the oxygen varies with the price of coal, and is estimated at the value of 6 kilogrammes (13 lb.) of coal, say 2d. to 3d. The oxygen is nearly pure, containing only about 3 per cent. of azote.

Trial of Electric Light again in Paris.—A wooden tower is being raised on the Buttes Montmartre, Paris, of about 3 mètres in height, and designed to receive an electric apparatus of great power, intended to light by night the whole quarter of the 18th Arrondissement, of which Montmartre is the chief seat. One light for a whole district, it is to be feared, will leave many deep shadows for thieves to skulk in, however bright and elevated it may be.

Roman London.—Within the last few days, in digging the foundations for some buildings in Queen Victoria-street, distinct traces of what was known as Wall-Brook were reached. The spot is now surrounded for a good distance by houses, but at one time was known as "The Old Barge Yard." A mass of broken masonry indicates the course of the ancient stream, and a small portion of Roman pavement of not very rich design reveals the capabilities of the old workman. The specimen to which we refer was discovered at about 18 ft. below the level of the present street, and is surrounded by the clay that once formed part of the brook's bed.

Iron Store at Chatham.—Workmen have commenced excavating for the foundations of a large store that is ordered to be built at the Chatham Gun Wharf. It has been found necessary to have a building erected in which to store the new gun-carriages and slides as they arrive from the manufactory. The building will be very massive, and will be constructed principally of iron. Messrs. Foord & Sons, Government contractors, Rochester, will be the builders.

Compliment to Surveyor of St. Olave's, Southwark, Board of Works.—As a recognition to Mr. Newman for his services in relation to the recent improvements in Tooley-street, effected without any call on the ratepayers as to it, the Board have unanimously resolved to present him with 100*l.*, out of the surplus improvement fund.

Co-operative Partnership.—Messrs. Bell, Goodman, & Co., Walker Ironworks, Newcastle-on-Tyne, who have been working on the co-partnership principle for twelve months, have made a profit of 21 per cent., of which 10 per cent. goes to the firm and 10 per cent. on the wages earned to the men; thus a man who has earned 50*l.* in the year gets 5*l.* dividend.

Highgate Workhouse.—At the last meeting of the Holborn Guardians it was reported by the architect to the Board that the walls of the south-west wing of the Highgate Workhouse were cracked, and that the foundations had sunk. The Building Committee were instructed to take steps to secure the building, and also to investigate the cause of the subsidence.

Sanitary Appliances.—The Sanitary and Economic Manure Company of Manchester exhibited their closet arrangements at the Manchester and Liverpool Agricultural Society's show at Bolton, and were awarded the Society's silver medal for the advantages of their system.

The London International Exhibition.—For the general convenience of the public and of the exhibitors it has been resolved to keep the Exhibition open till Saturday, the 19th October.

TENDERS

For farm-house and offices at Runwell, Essex, for Mr. Thomas Kemble. Mr. F. Whitmore, architect. Quantities by Messrs. Curtis & Son:—

Gozzett	£982 10 0
Brown	894 0 0
Lart	889 12 0
Letch	763 0 0
Walsh	746 3 0
Kennell	737 0 0

For Greenham Vicarage, Berks, for the Rev. O. E. Slocock. Mr. J. H. Money, architect. Quantities supplied:—

Harrison	£3,313 10 0
Elliott	2,780 0 0
Williams	2,720 0 0
Cooke & Groome	2,692 0 0
Adey	2,683 0 0

For erecting paper warehouse, in St. Bride-street. Mr. L. H. Isaacs, architect. Quantities supplied by Mr. L. C. Riddett:—

Elkington (accepted)	£2,500 0 0

For two mission halls, Poplar and Canning Town:—

	Poplar.	Canning Town.
Cawdron & Co.	£1,997	699
Gough	1,950	800
Darkly & Son	1,483	592
Hoskin, Brothers	1,295	493
Turner	1,273	550
Webb	1,150	425
Ware	987	406
Robbins	995	354
Omer	695	249
Mason & Bristy	625	328
Chrisp	898	228

For building new public elementary schools, Queenborough, Isle of Sheppy. Mr. B. Adkins, architect. Quantities supplied by Mr. T. T. Green:—

Bligh	£1,602 10 0
Miller	1,428 0 0
Shrubsole	1,348 0 0
Naylar (accepted)	1,197 0 0
Gammon	1,186 0 0

For additions to floor-cloth factory, Manor-road, Rotherhithe, for Messrs. Rolls & Sons:—

Aitchison & Walker (accepted)	£615 0 0

For additions to the Pwllheli National Schools. Messrs. Roberts & Morrow, architects:—

Roberts	£219 0 0
Williams (accepted)	204 7 3
Humphreys	190 0 0

For the enlargement of a mansion at Totteridge, Middlesex, for Mr. Shuttleworth. Quantities supplied:—

Scrivener & White	£1,720 0 0
Woodhall	1,400 0 0
Thomas	1,288 0 0
Gilmour (accepted)	1,260 0 0

For alterations and additions to house, and building stables, &c., at Star Grove, East Woodhay, near Newbury, Berks. Mr. F. C. Dyer, architect:—

Cooke & Groome (accepted)	£1,560 0 0

For the erection of hop warehouse and offices, Denman-street, Borough, for Mr. G. Gibbon. Mr. J. W. Reed, architect:—

Niblett & Son (accepted)	£2,790 0 0

For the erection of four houses, with shops, Crouch-end, Hornsey, for Mr. H. W. Elder. Mr. J. W. Reed, architect:—

Niblett & Son (accepted)	£2,600 0 0

For alterations and additions to the Bank, at Horsham, for the London and County Banking Company. Mr. F. Chancellor, architect. Quantities by Messrs. Curtis & Son:—

Dewdney	£1,938 0 0
Potter	1,880 0 0
Conder	1,828 0 0
Mann	1,815 0 0
Shearburn	1,794 0 0
Sharp	1,785 0 0
Hill & Son (accepted)	1,780 0 0

For re-building the Masons' Arms Tavern, Union-road, Bow, for Mrs. Wrangham. Messrs. Jewell & Co., architects. Quantities supplied by Mr. J. S. Lee:—

Merritt & Ashby	£3,466 0 0!
Patman & Fotheringham	3,450 0 0
Newman & Mann	3,435 0 0
Dewell	3,390 0 0
Mark	3,343 0 0
Sewell	3,333 0 0
Sawyer	3,285 0 0
Cresseall	3,256 0 0
King & Son	3,255 0 0
Lindfield	3,198 0 0
Stentiford	3,160 0 0
Cohen	3,010 0 0
Pearce	2,875 0 0
Lovell & Co.	2,792 0 0
George	2,697 0 0
Smith	1,870 0 0
Cooke & Groome	1,470 0 0!

For the extension and improvement of Plumtree-court, Shoe-lane, for the Corporation of the City of London. Mr. H. Jones, architect:—

Wigmore	£1,590 10 0
Ritson	1,585 0 0
Browne & Robinson	1,543 0 0
Hart	1,497 0 0
Carter & Son	1,467 0 0
Mowlem, Burt, & Freeman	1,450 0 0

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Major A. L. (received).—A. B. & Son (the T Iron will answer the purpose best with the flange at bottom: mode B). — A Reader (write to the inventor, Office of Works, Whitehall).—L. L.—B. S.—E.—D.—E. B.—R. E. S.—H. C. — C. R. & Co. — P. & B. — The Lord Mayor.—W. D.—T. U. S. — M. A. — W. D. F. — Mr. R. — J. V. — M. & Co.—C. J. P.—Nemo.—F. C. D.—H. C.—J. L.—T. T. G.—A. & W.

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